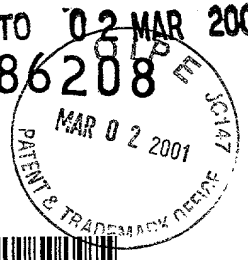


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REQUEST FOR FILING NATIONAL PHASE OF PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

00909

To: Hon. Commissioner of Patents
Washington, D.C. 20231

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: P 277852 /NI-0001PCT US
M# /Client Ref.

From: Pillsbury Winthrop LLP, IP Group: Date: March 2, 2001

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

1. International Application	2. International Filing Date	3. Earliest Priority Date Claimed
PCT/JP99/04178	02 August 1999	02 August 1999
⇧ country code	Day MONTH Year	Day MONTH Year
		(use item 2 if no earlier priority)

4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

(a) ☒ 20 months from above item 3 date (b) ☐ 30 months from above item 3 date,

(c) Therefore, the due date (unextendable) is April 2, 2001

5. Title of Invention ELECTRONIC SETTLEMENT SYSTEM, SETTLEMENT APPARATUS, AND TERMINAL

6. Inventor(s) NAKAJIMA, Keiichi

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).

8. ☐ **A copy of the International Application** as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:

a. ☐ Request;
b. ☐ Abstract;
c. _____ pgs. Spec. and Claims;
d. _____ sheet(s) Drawing which are ☐ informal ☐ formal of size ☐ A4 ☐ 11"

9. ☒ **A copy of the International Application has been transmitted by the International Bureau.**

10. **A translation of the International Application** into English (35 U.S.C. 371(c)(2))

a. ☒ is transmitted herewith including: (1) ☐ Request; (2) ☒ Abstract;
(3) 90 pgs. Spec. and Claims;
(4) 45 sheet(s) Drawing which are:
☐ informal ☒ formal of size ☒ A4 ☐ 11"

b. ☐ is not required, as the application was filed in English.

c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.

d. ☐ Translation verification attached (not required now).

RE: USA National Filing of PCT /JP99/04178

JC02 Rec'd PCT/PTO 02 MAR 2001

11. ☒ **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:
a. ☒ --This application is the national phase of international application PCT/JP99/04178 filed August 02, 1999 which designated the U.S.--
b. ☐ --This application also claims the benefit of U.S. Provisional Application No. 60/_____, filed _____ .--

12. ☐ Amendments to the claims of the International Application **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:**

13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau

14. ☐ Translation of the amendments to the claims **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments** made before 18th month, **is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).**

15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
a. ☒ is submitted herewith ☒ Original ☐ Facsimile/Copy
b. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.

16. **An International Search Report (ISR):**
a. Was prepared by ☐ European Patent Office ☒ Japanese Patent Office ☐ Other
b. ☒ has been transmitted by the international Bureau to PTO.
c. ☐ copy herewith (___ pg(s).) ☐ plus Annex of family members (___ pg(s).).

17. **International Preliminary Examination Report** (IPER):
a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
b. ☐ copy herewith in English.
c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
c.2 ☐ Specification/claim pages #_____ claims #
Dwg Sheets #
d. ☐ Translation of Annex(es) to IPER **(required by 30th month due date, or else annexed amendments will be considered canceled).**

18. **Information Disclosure Statement** including:
a. ☐ Attached Form PTO-1449 listing documents
b. ☐ Attached copies of documents listed on Form PTO-1449
c. ☒ A concise explanation of relevance of ISR references is given in the ISR.

19. ☒ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.

20. ☐ Copy of Power to IA agent.

21. ☐ **Drawings** (complete only if 8d or 10a(4) not completed): ___ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"

22. Small Entity Status ⌀ ☒ is **Not** claimed ☐ is claimed (**pre**-filing confirmation required)
22(a) _____ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)

23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) JAPAN of:

	Application No.	Filing Date		Application No.	Filing Date
(1)	PCT/JP99/04178	August 2, 1999	(2)		
(3)			(4)		
(5)			(6)		

a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
b. ☐ Copy of Form PCT/IB/304 attached.

RE: USA National Filing of PCT/JP99/04178

JC02 Rec'd PCT/PTO 02 MAR 2001

24. Attached:

25. **Preliminary Amendment:**

25.5 Per Item 17.c2, **cancel original** pages #_____, claims #_____, Drawing Sheets #

26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**
Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☐ 25, ☐ 25.5 (hilite)

Total Effective Claims	39	minus 20 =	19	x $18/$9	=	$342	966/967
Independent Claims	7	minus 3 =	4	x $80/$40	=	$320	964/965
If any proper (ignore improper) Multiple Dependent claim is present,				add$270/$135		+0	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): →→ **BASIC FEE REQUIRED, NOW** →→→→

A. If country code letters in item 1 are **not** "US","BR","BB","TT","MX","IL" "NZ", "IN" or "ZA"

See item 16 re:

1. Search Report was not prepared by EPO or JPO	add$1000/$500		960/961
2. Search Report was prepared by EPO or JPO	add$860/$430	+860	970/971

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US","BR","BB","TT","MX","IL", "NZ", "IN" or "ZA"

→ ☐ (X)	B. If USPTO did not issue both International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER),	add$970/$485	+0	960/961
(only) = (one) → ☐ (of)	C. If USPTO issued ISR but not IPER (or box 4(a) above is X'd),	add$710/$355	+0	958/959
(these) (4) → ☐ (boxes)	D. If USPTO issued IPER but IPER Sec. V boxes not all 3 YES,	add$690/$345	+0	956/957
→ ☐	E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied (IPER Sec. V all 3 boxes YES for all claims),	add $100/$50	+0	962/963

27. **SUBTOTAL =** $1522

28. If Assignment box 19 above is X'd, add Assignment Recording fee of ----$40 +40 (581)

29. Attached is a check to cover the **TOTAL FEES** $1562

Our Deposit Account No. 03-3975
Our Order No. 7874 (C#) | 277852 (M#)

00909

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.
This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed

Pillsbury Winthrop LLP
Intellectual Property Group

By Atty: Glenn J. Perry **Reg. No.** 28458

Sig: [signature] **Fax:** (202) 822-0944
Tel: (202) 861-3070

Atty/Sec: gjp/mhn

NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

ELECTRONIC SETTLEMENT SYSTEM, SETTLEMENT APPARATUS, AND TERMINAL

This is a continuation application of PCT/JP99/04178 filed on August 2, 1999, the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an electronic settlement system, a settlement apparatus, and its terminal.

2. Description of the Related Art

Conventionally, in an electronic settlement system, which executes a settlement of a commercial transaction electronically via a communication network, personal data such as a credit card number is sent in the form of digital data such as a credit card number via the Internet. Sending personal data such as a credit card number directly, the credit card number may be stolen and suffer from a false use. Thus, it is necessary to keep personal data from being leaked by using a high level of cryptology. To improve security, the electronic settlement system needs a complex authenticating procedure which, however, sacrifices convenience.

SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to solve such a problem and provide a safe and convenient electronic settlement system.

Therefore, it is an object of the present invention to provide an electronic settlement system, a settlement

apparatus, and its terminal which overcomes the above issues in the related art. This object is achieved by combinations described in the independent claims. The dependent claims define further advantageous and exemplary combinations of the present invention.

According to the first aspect of the present invention, an electronic settlement system for settling a transaction through a communication network comprises: a settlement apparatus which performs the settlement of the transaction; a billing terminal connecting to the settlement apparatus via the communication network; and a paying terminal, connecting to the settlement apparatus via the communication network,

wherein the settlement apparatus performs the settlement of a transaction by synchronizing a communication to the billing terminal with a communication to the paying terminal when the settlement apparatus sets up a transaction identifying number which identifies the transaction and when the paying terminal transmits the same transaction identifying number to the settlement apparatus.

The billing terminal may connect to the settlement apparatus via a commercial telephone line or a private line, and the paying terminal connects to the settlement apparatus via a radiotelephone communication.

According to the second aspect of the present invention, a settlement apparatus performing a settlement of a transaction, which communicates with a billing terminal performing billing of the transaction and with a paying terminal performing paying of the transaction, the apparatus comprises: a first communication unit connecting to the billing terminal via a first communication network; a second

communication unit connecting to the paying terminal via a second communication network; and a processing unit for processing the settlement of the transaction, the processing unit synchronizing a communication to the billing terminal with a communication to the paying terminal when the processing unit sets up a transaction identifying number to identify the transaction, and when the paying terminal transmits to the settlement apparatus the same transaction identifying number.

The first communication unit may connect to the billing terminal via at least one of a commercial telephone line and a private line, and the second communication unit connects to the paying terminal via radiotelephone communication.

The first communication unit may receives a purchase amount of the transaction from the billing terminal; the second communication unit transmits the purchase amount to the paying terminal so that the paying terminal confirms the purchase amount, and receives a final purchase confirmation signal; the processing unit may perform a settlement processing after the second communication unit receives the final purchase confirmation signal from the paying terminal; the first communication unit may transmit a settlement completion notification, which notifies completion of the settlement processing performed by the processing unit to the billing terminal; and the second communication unit may transmit to the paying terminal a receipt which notifies the receiving of the purchase amount of the settlement processed by the processing unit.

The apparatus may further comprises a billing terminal database storing information about the billing terminal, wherein the first communication unit receives from the

billing terminal an identifying number to identify the billing terminal, and the processing unit may retrieve information about the billing terminal from the billing terminal database and confirms a registration of the billing terminal, based on the identifying number.

The second communication unit may transmit to the paying terminal the information about the billing terminal, for the paying terminal to confirm the billing terminal, retrieved from the billing terminal database.

The apparatus may further comprises a paying terminal database which stores information about the paying terminal, wherein the second communication unit detects a calling telephone number of the paying terminal, and the processing unit may retrieve information about a user of the paying terminal from the paying terminal database based on the calling telephone number, and the processing unit inquires about at least one of a registration status of the user, a payment history of the user, and available amount of the user.

The processing unit may retrieve at least a part of attribute information of the user of the paying terminal from the paying terminal database, and the first communication unit transmits to the billing terminal at least a part of the attribute information of the user of the paying terminal.

When the second communication unit receives a message which demands a purchase history of the user of the paying terminal, the processing unit retrieves the purchase history of the user from the paying terminal database, and the second communication unit transmits the purchase history to the paying terminal.

The first communication unit may transmit to the billing terminal a transaction identifying number in order to identify the transaction, and the processing unit may synchronize a communication to the billing terminal with a communication to the paying terminal, and the first communication unit transmits to the billing terminal a synchronization confirmation signal which indicates establishment of synchronization, when the billing terminal notifies the transaction identifying number to at least one of the paying terminal and a user of the paying terminal, and when the paying terminal transmits to the settlement apparatus the same transaction identifying number.

The processing unit retrieves authentication information of the user of the paying terminal from the paying terminal database, and the first communication unit, for the billing terminal to authenticate the user, may transmit the authentication information of the user to the billing terminal. The authentication information of the user may be a facial portrait of the user.

The first communication unit may receive a signal requesting password authentication of the user from the billing terminal; the processing unit may retrieve information about the password of the user of the paying terminal from the paying terminal database; the second communication unit may transmit an order of a password request to the paying terminal and receives a password inputted by the paying terminal from the paying terminal; the processing unit, receiving the password from the paying terminal, may inquire about the information about the password retrieved from the paying terminal database; and the first communication unit may authenticate the user by

transmitting a password inquiry result performed by the processing unit to the billing terminal.

The processing unit may retrieve authentication information registered by the user of the paying terminal from the paying terminal database; the second communication unit may transmit an order to inquire about the authentication information to the paying terminal and receives an answer of the paying terminal inputting corresponding to the order from the paying terminal; and the processing unit may authenticate the user by verifying the answer received from the paying terminal against the authentication information retrieved from the paying terminal database.

The authentication information registered by the user of the paying terminal, which the processing unit retrieves from the paying terminal database, may be at least one of a password of the user, a voice data spoken from the user, a face image data of the user, an image data of an iris or retina of the user, and an image data of finger print of the user, and the answer of the processing unit receiving from the paying terminal in order to inquire with the authentication information may be at least one of character data, voice data, and image data.

The apparatus may further comprise a billing terminal database which stores information about the billing terminal, wherein: the processing unit retrieves information about the billing terminal from the billing terminal database so that the billing terminal confirms the paying terminal, the second communication unit transmits to the paying terminal the information about the billing terminal in addition to the transaction identifying number for identifying the

transaction, and when the paying terminal confirms the information about the billing terminal and transmits the transaction identifying number to the settlement apparatus, the processing unit synchronizes the communication to the billing terminal with the communication to the paying terminal, and the first communication unit transmits a synchronization confirmation signal which indicates establishment of synchronization with the billing terminal.

The first communication unit may receive from the billing terminal an item ordering information which is for a user of the paying terminal to input an order of an item, the second communication unit may transmit the item ordering information to the paying terminal, and when the paying terminal transmits to the settlement apparatus an order of an item, inputted by the user of the paying terminal based on the item ordering information, the first communication unit transmits the order of an item to the billing terminal.

The apparatus may further comprise a voice database which stores user voice data of the paying terminal, wherein: the second communication unit transmits a message prompting the paying terminal to input a user voice and receives the user voice from the paying terminal, and the processing unit, by inquiring about the voice of the user using the voice database, authenticates the user.

The settlement apparatus may authenticate the user, by the processing unit retrieving authentication information registered by the user of the paying terminal from the paying terminal database, the second communication unit may transmit an instruction which inquires the authentication information to the paying terminal, and the paying terminal receives an answer inputted corresponding to the instruction from the

paying terminal, and the processing unit may inquire the answer received from the paying terminal to the authentication information retrieved from the paying terminal database.

The authentication information, the processing unit retrieving from the paying terminal database and registered by the user of the paying terminal may be at least one of a password of the user, voice data spoken by the user, facial portrait image data of the user, at least one of iris and retina data of the user, and finger print image data of the user; and the answer of the processing unit receiving from the paying terminal in order to inquire with the authentication information is at least one of character data, voice data, and image data.

According to the third aspect of the present invention, a billing terminal performing billing of a transaction against a paying terminal paying for the transaction, by communicating with a settlement apparatus settling the transaction, comprises: a communication unit which connects to the settlement apparatus via a communication network, the communication unit transmitting an identification number to identify the billing terminal to the settlement apparatus and receiving from the settlement apparatus a synchronization confirmation signal indicating establishment of synchronization with the paying terminal; and a processing unit which performs billing of the transaction.

The communication unit may connect to the settlement apparatus via at least one of a commercial telephone line, a private line, and radiotelephone communication. The communication unit may receive from the settlement apparatus at least a part of attribute information of the user of the

paying terminal.

The apparatus may further comprise a display unit displaying a status of the transaction performed by the processing unit; wherein the communication unit receives a transaction identifying number to identify the transaction from the settlement apparatus, the display unit, by indicating the transaction identifying number, notifies the transaction identifying number to at least one of the paying terminal and a user of the paying terminal, and when the communication unit receives from the settlement apparatus a synchronization confirmation signal indicating the establishment of synchronization with the paying terminal, the display unit indicates that the communication unit receives the synchronization confirmation signal.

The apparatus may further comprise a short range communication unit, the short range communication unit transmitting the transaction identifying number to the paying terminal by communicating with the paying terminal via at least one of an optical communication and a wireless communication.

The communication unit may transmit to the settlement apparatus a purchase amount of the transaction and receives from the settlement apparatus a settlement completion notification to notify a completion of the settlement processing.

The communication unit may receive from the settlement apparatus authentication information of the user of the paying terminal, and the processing unit may authenticate the user based on the authentication information received from the settlement apparatus. The authentication information of

the user may be a facial portrait of the user.

The communication unit may transmit to the settlement apparatus a signal to demand password authentication of the user, and receives from the settlement apparatus a result of the password authentication of the user when the processing unit is not able to authenticate the user using the facial portrait of the user.

The apparatus may further comprise: an item choice unit by which the user of the paying terminal is prompted to choose a purchasing item, the item choice unit prompting the user to choose an item when the communication unit receives from the settlement apparatus the synchronization confirmation signal indicating the establishment of synchronization with the paying terminal; and an item sending unit through which a purchased item to be sent out, wherein the communication unit transmits to the settlement apparatus a price of the item chosen by the user as the purchase amount of the transaction, and when the communication unit receives the settlement completion notification from the settlement apparatus, the item sending unit sends out the item chosen by the user based on the settlement completion notification.

The communication unit may transmit to the settlement apparatus order information to prompt the user of the paying terminal to input an order of purchasing an item and receives from the settlement apparatus an order inputted by the user of the paying terminal based on the order information,

the communication unit may transmit to the settlement apparatus the purchase amount calculated by the communication unit and receives from the settlement apparatus a settlement completion notification to notify a completion of the settlement processing.

According to the fourth aspect of the present invention, a billing terminal for performing billing of a transaction, communicating with a settlement apparatus performing settlement of the transaction against a paying terminal performing a payment of the transaction, and communicating with a computer terminal indicating a status of the transaction to provide information about the transaction, the billing terminal comprises: a first communication unit connecting to the settlement apparatus via a communication network, the first communication unit transmitting an identifying number identifying the billing terminal to the settlement apparatus and receiving a transaction identifying number identifying the transaction from the settlement apparatus, and the first communication unit receiving from the settlement apparatus a synchronization confirmation signal indicating the establishment of synchronization with the paying terminal; a second communication unit connecting to the computer terminal via the communication network, the second communication unit transmitting to the computer terminal for a user of the paying terminal the transaction identifying number in order to notify the transaction identifying number; and a processing unit performing billing of the transaction.

The second communication unit may receive from the computer terminal a purchase amount of the transaction, and when the first communication unit transmits the purchase amount to the settlement apparatus and receives from the settlement apparatus a settlement completion notification which notifies a completion of the settlement processing.

The second communication unit, for the computer terminal to indicate a state of the transaction, may transmit

to the computer terminal at least one of the synchronization confirmation signal and the settlement completion notification for the first communication unit receiving from the settlement apparatus.

According to the fifth aspect of the present invention, an authentication apparatus for communicating with a first terminal and with a second terminal demanding to authenticate a user of the first terminal, and performing the authentication demanded by the second terminal, the apparatus comprises: a user database storing authentication information registered by a user of the first terminal; a first communication unit connecting to the first terminal via a first communication network, the first communication unit transmits to the first terminal an order to inquire the authentication information and receives from the first terminal an answer inputted by the first terminal corresponding to the order; a second communication unit connecting to the second terminal via a second communication network, the second communication unit receives from the second terminal an authentication demand to authenticate the user of the first terminal; and a processing unit performing the authentication, the processing unit sets up an identifying number to identify the authentication demanded by the second terminal, and when the first terminal transmits the same identifying number as the identifying number to the authentication apparatus, synchronizes a communication to the first terminal with a communication to the second terminal, retrieves from the user database authentication information to authenticate the user of the first terminal, and by inquiring the answer received from the first terminal with the authentication information retrieved from the user database, authenticates the user of the first terminal; wherein the second communication unit, by transmitting to the

second terminal an authentication result judged by the processing unit, may authenticate the user of the first terminal.

The authentication information, the processing unit retrieving from the user database, registered by the user of the first terminal may be at least one of a password of the user, voice data spoken by the user, facial portrait image data of the user, at least one of iris and retina data of the user, and finger print image data of the user; and the answer of the processing unit receiving from the first terminal in order to inquire with the authentication information is at least one of character data, voice data, and image data.

According to the sixth aspect of the present invention, a recording medium which stores a program for a computer, communicating with a billing terminal performing billing of a transaction and with a paying terminal performing payment of the transaction, and performing a settlement of transaction, the program comprises: a first communication module which operates the computer to communicate to the billing terminal via a commercial telephone line or a private line; a second communication module which operates the computer to communicate to the paying terminal via a radiotelephone communication; and a processing module which performs the settlement of transaction, the processing module setting a transaction identifying number which identifies the transaction and the processing module synchronizing a communication to the billing terminal with a communication to the paying terminal when the paying terminal transmits a transaction identifying number the same transaction identifying number to the settlement apparatus.

According to the seventh aspect of the present

invention, a program for a computer, communicating with a billing terminal performing billing of a transaction and with a paying terminal performing paying of the transaction, and performing a settlement of transaction, the program comprises:

a first communication module which operates the computer to communicate to the billing terminal via a commercial telephone line or a private line;

a second communication module which operates the computer to communicate to the paying terminal via a radio telephone communication; and

a processing module which performs the settlement of transaction, the processing module setting a transaction identifying number which identifies the transaction and the processing module synchronizing a communication to the billing terminal with a communication to the paying terminal when the paying terminal transmits a transaction identifying number the same transaction identifying number to the settlement apparatus.

This summary of the invention does not necessarily describe all necessary features of the present invention. The present invention may also be a sub-combination of the above described features. The above and other features and advantages of the present invention will become more apparent from the following description of embodiments taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a configuration of an electronic settlement system of a first embodiment of the present invention.

Fig. 2 shows a configuration of a cashier terminal 10.

Fig. 3 shows a configuration of a cellular phone as an example of a user terminal 20.

Fig. 4 is a schematic diagram showing a configuration of a synchronizing server 30.

Fig. 5 is a flow chart showing a settlement processing in an electronic settlement system of the first embodiment.

Fig. 6 is a flow chart showing cashier terminal information inquiry 104 processing.

Fig. 7 is a flow chart showing a transaction ID inquiry 116 processing.

Fig. 8 is a flow chart showing a user data inquiry 128 processing.

Fig. 9 shows a flow chart of a visual authentication 132 processing.

Fig. 10 is a flow chart showing an available amount checking 136 processing.

Fig. 11 is a flow chart showing a final purchase confirmation 140 processing.

Fig. 12 shows examples of information indicated on a display unit 702 of a cashier terminal 10.

Fig. 13 shows examples of information indicated on a display unit 802 of a user terminal 20.

Fig. 14 is a block diagram showing a configuration of an electronic settlement system of a second embodiment of the present invention.

Fig. 15 shows an example of a mail order catalog.

Fig. 16 is a flow chart showing a settlement processing in an electronic settlement system of the second embodiment.

Fig. 17 is a flow chart showing a cashier data inquiry 206 processing.

Fig. 18 is a flow chart showing a user data inquiry 208 processing.

Fig. 19 is a flow chart showing a password authentication 210 processing.

Fig. 20 is a flow chart showing synchronization 226 processing.

Fig. 21 is a flow chart showing an order input 234 processing.

Fig. 22 is a flow chart showing an available amount checking 244 processing.

Fig. 23 is a flow chart showing a final purchase confirmation 248 processing.

Fig. 24 shows examples of information indicated on a display unit 802 of a user terminal 20.

Fig. 25 is a block diagram showing a configuration figure of an electronic settlement system of a third embodiment of the present invention.

Fig. 26 is a flow chart showing processing a settlement using an electronic settlement system of the third embodiment.

Fig. 27 is a flow chart showing a user data inquiry 306 processing.

Fig. 28 is a flow chart showing a voice authentication 308 processing.

Fig. 29 is a flow chart showing a cashier data inquiry 315 processing.

Fig. 30 is a block diagram showing a configuration figure of an electronic settlement system according to the fourth embodiment of the present invention.

Fig. 31 shows a configuration of a portable terminal that has a communication facility as an example of a user terminal.

Fig. 32 is a flow chart showing the settlement processing using an electronic settlement system of the fourth embodiment.

Fig. 33 is a flow chart showing a user image data authentication 211 processing.

Fig. 34 is a block diagram showing a configuration of

an electronic settlement system applying the fifth embodiment of the present invention.

Fig. 35 shows a configuration figure of a vending machine 16.

Fig. 36 is a flow chart showing a settlement processing in an electronic settlement system applying the fifth embodiment of the present invention.

Fig. 37 shows examples of information indicated on a display unit 802 of a user terminal 20.

Fig. 38 is a block diagram showing a configuration of an electronic settlement system applying the sixth embodiment of the present invention.

Fig. 39 is a flow chart showing a settlement processing in an electronic settlement system applying the sixth embodiment of the present invention.

Fig. 40 is a flow chart showing cashier information inquiry 508 processing.

Fig. 41 is a flow chart showing a cashier number inquiry 528 processing.

Fig. 42 is a flow chart showing a user information inquiry 536 processing.

Fig. 43 is a flow chart showing a password authentication 538 processing.

Fig. 44 shows examples of information displayed on a user computer 22.

Fig. 45 shows a block diagram showing hardware architecture of a general-purpose computer 600.

Fig. 46 is a block diagram showing a functional architecture of software executed on a CPU 602.

DETAILED DESCRIPTION OF THE INVENTION

The invention will now be described based on the preferred embodiments, which do not intend to limit the scope

of the present invention, but exemplify the invention. All of the features and the combinations thereof described in the embodiment are not necessarily essential to the invention.

(First embodiment)

An electronic settlement system applying the first embodiment of the present invention will be explained as follows. Applying the electronic settlement system of the present embodiment, when a consumer purchases an item and pays its expense, the consumer may execute a settlement electronically via a network. The consumer is referred to as a user in the following.

Fig. 1 is a block diagram showing a configuration of an electronic settlement system of the present embodiment. The electronic settlement system of the present embodiment has a cashier terminal 10 as an example of a billing terminal, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement device, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, and a user account database 70.

A communication line 18, which is a communication path to connect the cashier terminal 10 with the synchronizing server 30, may be either a commercial telephone line or a private line. A radio communication channel 28 is a communication path of a radiotelephone communication to connect a user terminal 20 with a carrier server 40. A communication path 38 is a communication path to connect the carrier server 40 with the synchronizing server 30, and may be either a commercial telephone line or a private line.

The cashier terminal 10 calculates a purchase amount of items that the user purchased in a retailer's shop, and charges the user the purchase amount. Fig. 2 shows a configuration of a cashier terminal 10. The cashier terminal 10 has a user-side indicating unit 700, a clerk-side indicating unit 702, a cashier body 704, a synchronization indicator 706, and an infrared communicating unit 708. The cashier terminal 10 also has a communicating function connecting to the synchronizing server 30 via a commercial telephone line or a private line, which is not shown in the figure.

The user-side indicating unit 700 has a display screen on the opposite side to the clerk which is a back side of the cashier terminal 10 made with liquid crystal(or LCD) in order to display character information. The user-side indicating unit 700 displays a purchase amount, a "transaction ID" described in the following, and so on, and notifies information to the user. The clerk-side indicating unit 702 indicates a purchase amount calculating processing, an electronic settlement processing, and so on. The synchronization indicator 706 is a light that glows in order to indicate an establishment of "synchronizing status", which is described in the following, when the synchronization is established. The infrared communicating unit 708 communicates data via infrared communication to an infrared communication unit 808 of the user terminal 20.

The user terminal 20 directs the user to pay a value of the merchandise using credit means such as a credit card or a bankcard. An example of the user terminal 20 is a radiotelephone communication means such as a cellular phone. Another example of the user terminal 20 is a portable terminal such as a PDA or a notebook type personal computer

and so on, which may communicate by connecting to a radio communication means such as a cellular phone.

Fig. 3 shows a configuration of a cellular phone as an example of a user terminal 20. The user terminal 20 has an antenna 800, a display unit 802, a console unit 804, a keypad 806, and an infrared communication unit 808. The user terminal 20 communicates to the carrier server 40 through the antenna 800 via a radio communication channel 28. The user terminal 20 has a data packet communication facility and may transmit and receive digital data. The display unit 802 displays character information and image information transmitted and received by the data packet communication facility. Using the console 804, a menu or buttons displayed on the display unit 802 is selected. The keypad 806 provides buttons to input telephone numbers, a password, and so on. Using the infrared communication unit 808, data is transmitted to the infrared communicating unit 708 of the cashier terminal 10.

The user terminal 20 connects to the carrier server 40 via the radio communication channel 28. The carrier server 40 connects to the synchronizing server 30 via the communication line 38. Therefore, the user terminal 20 communicates with the synchronizing server 30.

The synchronizing server 30 performs a settlement processing in a transaction between the retailer and the user. The synchronizing server 30 connects to the cashier database 50 for accumulating information from the cashier terminal 10, the user database 60 for accumulating information from the user terminal 20, and the user account database 70 for accumulating information of the credit account or the bank account of users; and searches each database and retrieves the information. The synchronizing

server 30, the cashier database 50, the user database 60, and the user account database 70 may be arranged in a network of a credit company or a bank network. However, only the user account database 70 may be arranged in the network of a credit company or the bank network whereas the synchronizing server 30 may be connected to the user account database 70 via the private line.

The synchronizing server 30 connects to the cashier terminal 10 and the user terminal 20, and performs data communication thereamong. The cashier terminal 10 does not directly communicate with the user terminal 20.

The synchronizing server 30 acquires information about the billing of a commodity transaction by communication to the cashier terminal 10, acquires information about the paying of a commodity transaction by communication to the user terminal 20, and processes the settlement in transactions between the cashier terminal 10 and the user terminal 20 by synchronizing the communication to the cashier terminal 10 with the communication to the user terminal 20.

Fig. 4 is a configuration figure of the synchronizing server 30. The synchronizing server 30 has a settlement processing unit 80, a first communication unit 82 for processing data communications via the communication line 18, a second communication unit 84 for processing data communications via the communication line 38 and the radio communication channel 28, a cashier database 50, and a database retrieving unit 86 which accesses the user database 60 and the user account database 70 and retrieves information from those databases.

A configuration of a "synchronizing settlement" and a "synchronizing authentication" using the electronic

settlement system of the present embodiment is described as follows.

A "synchronizing settlement" is a method that does not directly communicate between the cashier terminal 10 and the user terminal 20, but rather processes a transaction settlement between the cashier terminal 10 and the user terminal 20, by synchronizing communication in real-time between the cashier terminal 10 and the user terminal 20 via the synchronizing server 30 which communicates with both the cashier terminal 10 and the user terminal 20.

In the electronic settlement system, transaction settlements are performed between a plurality of cashier terminals 10 and a plurality of user terminals 20. Accordingly, the synchronizing server 30 specifies the cashier terminal 10 billing a certain transaction and the user terminal 20 paying for the transaction, and then synchronizes the communication between the cashier terminal 10 and the user terminal 20, so that it processes the transaction of settlement between the cashier terminal 10 and the user terminal 20.

In order to synchronize the communication to the cashier terminal 10 with the communication to the user terminal 20,a transaction ID is defined as an example of a transaction identifying number in order to identify a certain transaction. Whenever a cashier terminal 10 connects to and communicates with the synchronizing server 30, the synchronizing server 30 defines a transaction ID, and transmits it to the cashier terminal 10. The cashier terminal 10 indicates the transaction ID received from the synchronizing server 30 on a user-side indicating unit 700, and shows the user the transaction ID.

The user, using the user terminal 20, inputs the shown transaction ID, and transmits the transaction ID to connect to the synchronizing server 30. If the transaction ID received from the user terminal 20 matches a transaction ID of one of the plurality of cashier terminals 10 which have already issued transaction ID's, the synchronizing server 30 allows the user terminal 20 to synchronize with the cashier terminal 10 and to communicate with each other. If a matching transaction ID is not able to be found, the user terminal 20 is not allowed to synchronize with any cashier terminals 10. Thus, for a certain transaction identified by the transaction ID, the synchronizing server 30 specifies the cashier terminal 10 billing the transaction and the user terminal 20 paying for the transaction by means of the transaction ID, synchronizes the communication between the cashier terminal 10 and the user terminal 20, and processes the settlement. Therefore, the settlement of transactions is performed between the cashier terminal 10 and the user terminal 20 without a direct communication therebetween.

A system of a "synchronizing authentication" will be explained in the following. A "synchronizing authentication" is an authentication method where the cashier terminal 10 authenticates the user of the user terminal 20 by synchronizing a communication to the cashier terminal 10 with that to the user terminal 20 via the synchronizing server 30, which communicates with both the cashier terminal 10 and the user terminal 20. But the cashier terminal 10 does not communicate to the user terminal 20 directly, and the user terminal 20 does not communicate with the cashier terminal 10 directly. Between the cashier terminal 10 and the user terminal 20, information about the authentication is not transmitted directly to each other.

Here, as an example, a case where a clerk using a cashier terminal 10 authenticates if the user of a user terminal 20 is the owner of the user terminal 20, will be explained.

A cellular phone, as an example of a user terminal 20, has a predetermined calling telephone number unique for each cellular phone, so that the predetermined calling telephone number is used with every dialing. The calling telephone number is unique to each cellular phone, and any other cellular phone is not able to make a phone call with the same calling telephone number. Therefore, as long as the original owner uses his or her cellular phone, the calling telephone number of a cellular phone may be used for specifying user identification. That is, a cellular phone may work as an ID like a driving license.

Concerning a case where the owner of a cellular phone lost his or her cellular phone and someone else uses the lost cellular phone, the cellular phone may be uniquely specified with the calling telephone number, but the user of the cellular phone may not be specified to the owner of the cellular phone. The electronic settlement system stores data corresponding to a calling telephone number of each cellular phone with the information of the owner of each cellular phone in the user database 60, and authenticates if the user of a cellular phone is the actual owner.

When the synchronizing server 30 connects to the user terminal 20, the synchronizing server 30 detects a calling telephone number of the user terminal 20, retrieves the user database 60 based on the calling telephone number, extracts information about the user, and authenticates the user. There are several types of authentication methods, such as visual authentication, password authentication, voice

authentication, and so on. These authentication methods may be combined with each other.

When using a visual authentication, the synchronizing server 30 retrieves a facial portrait data of the user from the user database 60, transmits to the cashier terminal 10, and prompts the clerk to authenticate if the user is the original owner. When using the password authentication, the synchronizing server 30 retrieves password information from the user database 60, transmits a password demanding instruction to the user terminal 20, and prompts the user to input the password from the user terminal 20 and to transmit the password to the synchronizing server 30. The synchronizing server 30 inquires about the transmitted password and the password registered in the user database 60, and transmits an authentication result to the cashier terminal 10. When using the voice authentication, in place of a password, voice data where the user speaks a predetermined word is recorded in a database in advance; the synchronizing server 30 prompts the user to input the vocalized voice data of the registered word from the user terminal 20, and prompts the user to transmit to the synchronizing server 30.

Furthermore, when the visual authentication alone is not enough, an accuracy of the authentication may be improved by multiple authentications combined with another authentication method such as the password authentication.

Applying the "synchronizing authentication", the cashier terminal 10 and the user terminal 20 do not communicate directly with each other. Thus, secret information such as a password is not sent between the cashier terminal 10 and the user terminal 20. The synchronizing server 30, which communicates with both the

cashier terminal 10 and the user terminal 20, mediates the authentication processing. Thus, the clerk who uses the cashier terminal 10 may authenticate the user who uses the user terminal 20 indirectly. Therefore, the user, without telling security information such as a password to the clerk, nor transmitting password data and so on from the user terminal 20 to the cashier terminal 10, may authenticate himself or herself. The authentication of the user may be performed without a leak of the user's personal information. In case the data sent between the user terminal 20 and the synchronizing server 30 is stolen by wiretapping and so on, for example, because the personal information is not sent at all, no problem occurs.

Combining the "synchronizing settlement" with the "synchronizing authentication" may realize an electronic settlement system that ensures security, privacy protection, and reliability at a high level. Furthermore, a cellular phone or a portable terminal connecting for data communication with a cellular phone and so on has a portability, that is the user may take the terminal anywhere, and a simplicity, that is the user may communicate with a network via radiotelephone communication from anywhere. Therefore, an electronic settlement system of the present embodiment enables to realize an electronic settlement with high reliability, security, and convenience.

Referring to Fig. 5 to Fig. 13, processing of the electronic settlement of the present embodiment, where a user settles a payment with the electronic settlement system using a user terminal, is described as follows. Fig. 5 is a flow chart showing a settlement processing in an electronic settlement system of the first embodiment. Fig. 5 is a flow chart in chronological order showing the settlement

processing between the cashier terminal 10, the user terminal 20, and the synchronizing server 30 . Between the cashier terminal 10, the user terminal 20, and the synchronizing server 30, information interaction is indicated using arrows in a lateral direction. Fig. 6 to Fig. 11 are flow charts showing details of processing in Fig. 5. Fig. 12 shows examples of information displayed on the clerk-side indicating unit 702 of a cashier terminal 10. Fig. 13 shows examples of information displayed on a display unit 802 of a user terminal 20.

In the following, except a case where special notification is made, the interaction of information between the cashier terminal 10 and the synchronizing server 30 is performed via a communication line 18, and the interaction of information between the user terminal 20 and the synchronizing server 30 is performed via a radio communication channel 28 and a communication line 38. An access method from the cashier terminal 10 to the synchronizing server 30 may be either a dial up access method from the commercial telephone line or a method of access to a server gate via a private line. An access method from the user terminal 20 to the synchronizing server 30 is performed via a radiotelephone communication when the user uses a cellular phone as a user terminal 20.

Referring to Fig. 5, the settlement processing is described in the following. A user purchases an item from a retailer, and pays the value of the merchandise at a cashier over the counter. First, the user chooses an electronic settlement. The clerk, at the user's request of electronic settlement, chooses the electronic settlement menu on the cashier terminal 10, and the electronic settlement starts (100). The cashier terminal 10 accesses the synchronizing

server 30 (102). The cashier terminal 10 transmits a cashier registration number which is unique to each cashier terminal when the cashier terminal 10 accesses the synchronizing server 30.

Corresponding to access from the cashier terminal 10, the synchronizing server 30 starts to connect the cashier terminal 10, and inquires the cashier terminal information based on the cashier registration number transmitted from the cashier terminal 10 (104).

Referring to Fig. 6, the cashier terminal information inquiry 104 processing will be described. The synchronizing server 30 accesses the cashier database 50 (1042) and retrieves the cashier terminal information of a cashier terminal matching to the cashier registration number (1044). A name of the retailer, a name of the shop, an authentication method, and so on are registered in the cashier terminal information. The authentication method may be chosen from a visual authentication method, a password authentication method, and so on. The cashier terminal information includes authentication methods to be used. The synchronizing server 30 decides to adopt the authentication method registered in the cashier terminal information (1046). Here, a case that adoption of a visual authentication method is selected for an authentication method is described as follows.

The synchronizing server 30 allocates a transaction ID to the cashier terminal 10 (1048). The transaction ID is a number for identifying the settlement that is going to be processed by the cashier terminal 10.

The transaction ID may be a sequence of numbers, for example, created by random number generation. For convenience of input from the user terminal 20, the

transaction ID is preferably the smallest digit possible. On the other hand, the same cashier terminal identifying number could be allocated on a plurality of cashier terminals 10 or user terminals 20; in such a case, the synchronizing server 30 is not able to correspond a cashier terminal 10 to the user terminal 20 for the transaction. For that reason, the transaction ID is allocated in the way that the same transaction ID is not used twice or more in a predetermined period. On the other hand, the same transaction ID may be used again after the predetermined period. Thus, without increasing the digits of the transaction ID, uniqueness of the transaction ID may be maintained.

When a retailer has a plurality of branches, the transaction ID created at a branch by random number generation may compete with the transaction ID created at another branch. In such a case, in order to avoid the competition of the transaction IDs allocated by two or more branches, the range of the generated random numbers for transaction IDs allocated to each branch may be limited.

Therefore, a transaction ID, even though it is a number for identifying transactions, does not need to be a large digit number such as a purchase ID, which is a number unique to every transaction; but needs to be a digit small enough to keep the uniqueness only for a certain period.

Referring back to Fig. 5, processing after the cashier terminal information inquiry 104 will be described in the following. The synchronizing server 30 delivers the transaction ID to the cashier terminal 10 (106). Here, the synchronizing server 30 is on an "access wait" status that is waiting for the user terminal 20 to access using this transaction ID. On the other hand, the cashier terminal 10 that delivered the transaction ID is defined as being on a

"synchronizing waiting" status.

The cashier terminal 10 displays the transaction ID transmitted from the synchronizing server 30 on a user-side indicating unit 700 (108). The cashier terminal 10 displays information shown in Fig. 12 (a), so that it indicates not only the transaction ID but also the "synchronizing wait" of the user terminal. The "synchronizing wait" is waiting while the user terminal accesses the synchronizing server 30 using the transaction ID. The clerk notifies the transaction ID displayed on the cashier terminal 10 to the user (110). The clerk may orally tell the user the transaction ID. Alternatively, the clerk may show the transaction ID displayed on the user-side indicating unit 700 of the cashier terminal 10.

The clerk may cancel the settlement processes by choosing "cancel" from the information displayed as shown in Fig. 12 (a). This cancel processing may be used when the user terminal 20 is not able to access the synchronizing server 30 because of poor radio conditions and so on, or the transmission is performed normally, but the synchronizing server 30 is not able to establish the synchronization even though the transaction ID is transmitted from the user terminal 20.

Information for inputting a "transaction ID" as shown in Fig. 13(a) is displayed on the user terminal 20. The user inputs the transaction ID notified from the clerk (112). The user chooses the "transaction ID" from the input information, and the transaction ID is transmitted to the synchronizing server 30 (114). The user may choose "cancel" in this processing to cancel the settlement processing and finish the processing. This cancellation processing may be used in a case where the settlement processing may not be performed

even when inputting a transaction ID correctly, caused by a communication disorder and so on.

The synchronizing server 30 receives the transaction ID transmitted from the user terminal 20, and makes an inquiry to the transaction ID (116).

A "synchronization" of the cashier terminal 10 with the user terminal 20 produced by the inquiry of the transaction ID is described in the following. First, the synchronizing server 30 is on an "access wait" status, which is waiting to be accessed by the user terminal 20 and waiting for the transaction ID to be sent. On this "access wait" status, if a user terminal 20 using the same transaction ID to be allocated to the cashier terminal 10 accesses, the synchronizing server 30 establishes one to one "synchronizing " status between that cashier terminal 10 and the user terminal 20, and realizes a synchronization of the communication to the cashier terminal 10 with the communication to the user terminal 20. Access from a plurality of the user terminals 20 is not matched to one cashier terminal 10 for one transaction ID.

A time out limit is set up for the "access wait" status of the synchronizing server 30 which limits the access wait period with the user terminal 20 to a predetermined length, for example, 3 minutes. When no answer from the user terminal 20 for an issued transaction ID is obtained for a predetermined period, the synchronizing server 30 shuts down the connection to the cashier terminal 10, and it is initialized. This time out function is set up in order to avoid trouble for cases where a user cancels the processing or that a communicating condition of the user terminal 20 with the synchronizing server 30 is poor so that data communication is not able to be performed normally, and so

on.

Referring to Fig. 7, the transaction ID inquiry 116 processing is described. As shown in Fig. 7, the synchronizing server 30 on the "access wait" status checks if access from the user terminal 20 has existed, and if a transaction ID confirming signal has been sent from the user terminal 20 (1162). If there has been no access, it checks if it exceeds the time out limit (1164), and in a case where it exceeds, it shuts the connection to the cashier terminal 10 down (1166) and finishes the processing. Then, information shown in Fig. 12 (b), which indicates the forced termination of the connection, is displayed on the cashier terminal 10.

When the user terminal 20 transmits the transaction ID, it is checked whether a cashier terminal 10 on the "synchronizing wait" status corresponding to the transaction ID is found (1168), and if not, it transmits a synchronizing error message to the user terminal 20 (1170). The user terminal 20 displays the synchronizing error message shown in Fig. 13 (b) on the display (1172). If the user chooses "OK" here, it goes back to the processing 112, the user terminal 20 displays the information shown in Fig. 13 (a) again, and re-input of the transaction ID is prompted to the user.

When a cashier terminal 10, which corresponds to the transaction ID transmitted from the user terminal 20, is found and is on the "synchronizing wait" status, the synchronizing server 30 establishes a "synchronizing" status between the cashier terminal 10 and the user terminal 20 and synchronizes the communication to the cashier terminal 10 with the communication to the user terminal 20 (1174).

Referring back to Fig. 5 again, when the

synchronization is established, the synchronizing server 30 sends a synchronizing signal to the cashier terminal 10 (118). The cashier terminal 10 receives the synchronizing signal from the synchronizing server 30 and lights a synchronization indicator 706 on the cashier terminal 10 (120). With this indicator, the clerk may tell if the synchronization is established.

When the synchronization starts, the synchronizing server 30 sends to the user terminal 20 the cashier terminal information retrieved from the cashier database 50 in the cashier terminal information inquiry 104. The user terminal 20 displays the information shown in Fig. 13 (c), and prompts the user to confirm the synchronized cashier terminal (124). When the user chooses "cancel", the processing goes back to the input of the transaction ID 112 processing. This cancellation is used when the user inputted an incorrect transaction ID and synchronizes with an incorrect cashier so that the settlement processing needs to be canceled and so on.

When the user chooses "OK" in Fig. 13 (c) displayed on the user terminal 20 and confirms the cashier terminal information, the user terminal 20 transmits a cashier terminal information confirmation signal to the synchronizing server 30 (126). The synchronizing server 30, receiving the cashier terminal information confirmation signal transmitted from the user terminal 20, performs the user information inquiry 128 processing.

Referring to Fig. 8, the processing of the user data inquiry 128 will be described. The synchronizing server 30 retrieves a user terminal number from a user terminal 20 (1280). When the user terminal 20 is a cellular phone, the user terminal number is the calling telephone number. The

synchronizing server 30 accesses the user database 60 (1282) and checks if the user terminal 20 is registered based on the user terminal number (1284). When the user terminal is not registered, the synchronizing server 30 transmits to the user terminal 20 a message "you are not registered. " (1286). Information shown in Fig. 13(d) notifying that the user does not have user registration is displayed on the user terminal 20. The synchronizing server 30 releases the synchronization of the cashier terminal 10 with the user terminal 20 (1290) and finishes the processing.

When the user registration is verified, user data is retrieved from the user database 60 (1292). Information about the payment history of the user is included in the user data. Whether the user has a problem with his or her payment history on his or her credit card or bankcard and so on is checked based on the information (1294). When any problem is found in his or her payment history, a message "we cannot accept your access." is transmitted to the user terminal 20 (1296). Information notifying that settlement is rejected, as shown in Fig. 13 (e), is displayed on the user terminal 20. The synchronizing server 30 releases the synchronization of the cashier terminal 10 with the user terminal 20 (1298) and finishes the processing.

When the user has no problem with his or her credit history, the synchronizing server 30 goes to the next step. Referring back to Fig. 5, the synchronizing server 30 performs a "synchronizing multiple authentication" based on the cashier terminal information inquiry 104. The synchronizing multiple authentication is an authentication having a plurality of authentication stages being performed between the cashier terminal 10 and the user terminal 20. The synchronizing server 30 performs the synchronizing

multiple authentication after the synchronization with both the cashier terminal 10 and the user terminal 20 is established. Between the cashier terminal 10 and the user terminal 20, information for authentication is not sent directly to each other, but the information for authentication is sent between the cashier terminal 10 and the synchronizing server 30, and between the user terminal 20 and the synchronizing server 30. Because the synchronizing server 30 intermediates the authentications, the clerk may authenticate the user of the user terminal 20 with no exchange of personal information between the user and the clerk.

The synchronizing multiple authentication processing is described in a case where the visual authentication is adopted in the cashier terminal information inquiry 104. The synchronizing server 30 retrieves a user facial portrait image from the user database 60 in the user information inquiry 128, and transmits the facial portrait image data to the cashier terminal 10 (130). The cashier terminal 10 receives the user facial portrait image data from the synchronizing server 30, and performs the visual authentication (132).

Fig. 9 shows the visual authentication 132 processing. The cashier terminal 10 displays a facial portrait image of the user (1320). Fig. 12 (d) shows an example of information displayed on the cashier terminal 10. The clerk verifies the user and the displayed facial portrait, and authenticates the user (1322). When the clerk is not able to ensure the user authentication or the payment is expensive, the clerk chooses "DOUBT" as displayed in Fig. 12 (d), and the cashier terminal 10 transmits a DOUBT signal to the synchronizing server 30 (1324). In this case, the cashier terminal 10 displays

information that shows the password authentication is being processed such as shown in Fig. 12 (e). When the clerk chooses "OK" as displayed in Fig. 12 (d), the visual authentication 132 processing is completed.

In order to perform the password authentication, the synchronizing server 30, receiving the "DOUBT" signal from the cashier terminal 10, retrieves data necessary for authentication from the user database 60 and generates authentication data (1326). The synchronizing server 30 initializes a password require count variable n, which stores the password require count, to 0 (1328). The synchronizing server 30 increments n to n+1 (1330) and transmits a password request message to the user terminal 20 (1332). Information shown in Fig. 13(f) is displayed on the user terminal 20. The user inputs the password (1334). The user terminal 20 transmits the password inputted by the user to the synchronizing server 30 (1336). The synchronizing server 30 receives the password transmitted from the user terminal 20 and verifies the password (1338).

When the password transmitted from the user terminal 20 is incorrect, it is checked whether the required password count n is 2 or more (1340), if not, it goes back to the processing of 1330 and requests the password again. If the required password count n is 2 or more, an invalid message is transmitted to the user terminal 20 (1344). Because the authentication is not confirmed, information shown in Fig. 13(g) that the settlement service is not available is displayed on the user terminal 20 (1346). Also, an invalid message is transmitted to the cashier terminal 10 (1342). The cashier terminal 10 displays the information indicating that the password authentication is invalid (1350), and finishes the processing. The synchronizing server 30, after

sending the invalid message to the user terminal 20 and the cashier terminal 10, releases the synchronization of the cashier terminal 10 with the user terminal 20 (1348).

In the password inquiry 1338 of the password authentication, if the synchronizing server 30 confirms the password, the synchronizing server 30 transmits to the cashier terminal 10 a password authentication OK signal (1348). The cashier terminal 10 displays information shown in Fig. 12 (f) indicating the completion of the password authentication (1350), and the visual authentication processing 132 is finished.

Referring back to Fig. 5, after the cashier terminal 10 finishes the visual authentication processing 132, the cashier terminal 10 transmits to the synchronizing server 30 purchase amount information, including the purchase amount (134). The synchronizing server 30, receiving the purchase amount information from the cashier terminal 10, performs available amount check processing 136.

Referring to Fig. 10, the processing of the available amount checking 136 will be described as follows. The synchronizing server 30 compares the purchase amount transmitted from the cashier terminal 10 with the available amount limit retrieved from the user database 60 in the user data inquiry 128 (1362). If the purchase amount does not exceed the available amount limit, the inquiry processing is finished. If the purchase amount exceeds the available amount limit, a message "your purchase exceeds your available amount limit" is transmitted to the user terminal 20 (1364). The synchronizing status of the cashier terminal 10 with the user terminal 20 is released (1366). Then, information shown in Fig. 13(h) is displayed on the user terminal 20.

Referring back to Fig. 5 again, the processing after the available amount checking 136 is completed will be described. The synchronizing server 30 transmits purchase amount information including the purchase amount to the user terminal 20 (138). The user terminal 20, receiving purchase amount information from the synchronizing server 30, performs the processing of the final purchase confirmation 140.

Referring to Fig. 11, the processing of the final purchase confirmation 140 will be described as follows. The user terminal 20 displays information shown in Fig. 13(i) in order to display the purchase amount (1402). The user confirms if the purchase amount is correct (1404). If correct, the user chooses "OK" on the display and finishes the processing of the final purchase confirmation 140. If the purchase amount is incorrect, the user chooses to "cancel". When the user chooses to "cancel", information which shows the settlement is canceled, as shown in Fig. 13(j), is displayed on the user terminal 20 (1406), and the user terminal 20 transmits a cancel signal to the synchronizing server 30 (1408). The synchronizing server 30, receiving the cancel signal from the user terminal 20, transmits a cancel signal to the cashier terminal 10 (1410). The cashier terminal 10 cancels the settlement, displays information shown in Fig. 12(g) which indicates that the settlement is canceled by the user, and finishes the processing (1412). The synchronizing server 30, after transmitting the cancel signal to the cashier terminal 10, releases the synchronization of the communication to the cashier terminal 10 with the communication to the user terminal 20 (1414).

Referring back to Fig. 5 again, the processing after the final purchase confirmation 140 is finished will be

described. The user terminal 20 transmits a final purchase confirmation signal to the synchronizing server 30 (142). The synchronizing server 30, receiving the final purchase confirmation signal from the user terminal 20, accesses the user account database 70 and performs the settlement processing which records the purchase information (144). When the settlement is completed, the synchronizing server 30 transmits a settlement completion notification to the cashier terminal 10 (146), and transmits a receipt to the user terminal 20 (150). The cashier terminal 10 displays information shown in Fig. 12(h) of the completion of the settlement (148). The user terminal 20 displays information shown in Fig. 13(k) to show completion of the settlement (152).

In the above described settlement processing, when the synchronizing server 30 transmits the settlement completion notification 146 to the cashier terminal 10, the synchronizing server 30 may retrieve a part of the attribute information about the user of the user terminal 20 which performs the payment of the settlement from the user database 60, and may transmit the information to the cashier terminal 10. The attribute information about the user transmitted to the cashier terminal 10 preferably may be information about sex or age of a user and so on. On the other hand, personal information such as a name, an address, and a credit card number is not suitable to be included in the attribute information. The cashier terminal 10 obtains the attribute information so that the retailer may retrieve the information about the user who performed the payment of the settlement, and may store the information about the item and the user data. Thus, the cashier terminal 10 may form a purchase history database in the retailer's database. The retailer may detect buying behavior, such as an age group for users of

a certain item from the purchase history stored in the database, for marketing.

When the synchronizing server 30 receives the purchase amount of items from the cashier terminal 10, the synchronizing server 30 may also receive the name and/or price of purchased items and detailed information of purchased items. The synchronizing server 30 may store this information in the user database 60 as a user purchase history. The user terminal 20 may inquire about the user purchase history to the synchronizing server 30, and receive the user purchase history from the synchronizing server 30.

The function and performance of the settlement processing for the electronic settlement system applying the present embodiment is described above. In the interaction of the above described settlement, if there is any communication trouble such as an interruption of communication, all of the information and temporally data about the processing are initialized and the processing is finished.

In the settlement processing described above, the clerk orally tells the transaction ID to the user or shows the user the transaction ID displayed on the user-side indicating unit 700 on the cashier terminal 10. But, the method to tell the transaction ID to the user or the user terminal 20 is not limited to these examples. The transaction ID received by the cashier terminal 10 may be sent from the infrared communicating unit 708 of the cashier terminal 10 to the infrared communication unit 808 of the user terminal 20. Thus, the user does not need to input a transaction ID into the user terminal 20, therefore the miss-input of the transaction ID is avoided. Furthermore, as a means to transmit the transaction ID from the cashier terminal 10 to the user terminal 20, a radio communication unit, the cashier

terminal 10, and the user terminal 20 may have a wireless communication unit as an example of a short range communication unit, and using wireless communication for a portable terminal such as Bluetooth, sends transaction ID to each other.

The cashier terminal information inquiry 104 processing, the transaction ID inquiry 116 processing, the user information inquiry 128 processing, available limit inquiry 136 processing, and the settlement processing 144 processing, which are performed by the synchronizing server 30 in the above described settlement processing, is actually performed by the settlement processing unit 80 and data retrieving unit 86 of the synchronizing server 30.

The receiving of the access from the cashier terminal 10 102 processing, transaction ID transmission to the cashier terminal 10 106 processing, sending the synchronizing signal to the cashier terminal 10 118 processing, sending the user facial portrait image to the cashier terminal 10 130 processing, receiving the purchase amount information from the cashier terminal 10 134 processing, and notification of the settlement completion 146 processing, as the data communication processing of the synchronizing server 30 with the cashier terminal 10, are performed by a first communication unit 82 of the synchronizing server 30.

The receiving of the transaction ID from the user terminal 20 114 processing, sending to the user terminal 20 the cashier terminal information 122 processing, receiving from the user terminal 20 the cashier terminal information confirmation signal 126 processing, transmitting to the user terminal 20 purchase amount information 138 processing, receiving from the user terminal 20 the final purchase confirming signal 142 processing, and the notification of

receipt to the user terminal 20 150 processing, as the data communication processing of the synchronizing server 30 with the user terminal 20, are performed by a second communication unit 84 of the synchronizing server 30.

The "synchronizing multiple authentication" applied in the electronic settlement system of the present embodiment is complemented here. The present embodiment may multiply authentication, which means a combination of a plurality of the authentication methods. Applying the synchronizing multiple authentication method, the user previously registers a plurality of passwords to the user database 60. A four-digit number is usually used for a personal identification number for a credit card or a bankcard. A user often chooses a simple combination of numbers, his or her birth date, telephone number, and so on, in order not to forget. Other people may easily guess the number so that the number suffers from a false use. Applying the "synchronizing multiple authentication" method, the user previously registers a plurality of personal information not known by others such as his or her mother's maiden name, name of grandfather or grandmother, name of his or her domicile of origin town, and so on. The synchronizing server 30 chooses at least one of the pieces of registered information, and transmits to the user terminal 20 a question which is asked to the user about the chosen registered information. Only the original owner of the user terminal 20 may answer the randomly chosen question. Thus, when the authentication using a facial portrait is not enough, further inquiries about a password or personal information are used so that the accuracy of the authentication may be improved. For the user, without using a combination of numbers difficult to remember, personal inerrable information that is not known by others and hard to forget may be used for his or her password. Because the

synchronizing server 30 intermediates the authentication between the user terminal 20 and the cashier terminal 10, no password information is sent from the user terminal 20 to the cashier terminal 10. Thus, the user's password is not known by the clerk, therefore the user may use the password without suffering from a false use.

Applying the electronic settlement system of the present embodiment, the clerk of the retailer authenticates the user with facial portrait data. The clerk further requests the user to input a password, and accuracy of authentication may be improved corresponding to the importance of a situation such as a doubtful case or for an expensive settlement. The user, using a portable apparatus having a wireless communication function such as a cellular phone or a portable terminal, may settle a transaction simply, conveniently, and safely.

(Second Embodiment)

An electronic settlement system according to the second embodiment of the present invention will be explained as follows. Applying the electronic settlement system of the present embodiment, a user, who reads a mail order advertisement in a newspaper, a magazine, a mail order catalog and so on, may order an item and execute a settlement via a network using a user terminal such as a portable telephone or a portable terminal.

Fig. 14 is a block diagram showing a configuration of an electronic settlement system of the present embodiment. The electronic settlement system of the present embodiment has a virtual cashier terminal 12 as an example of a billing terminal, a cashier server 14 which includes a plurality of

virtual cashier terminals 12, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement device, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, and a user account database 70.

The cashier server 14 is a server system to represent distribution in a mail order, which is composed of virtual cashier terminals 12 in the server and performs billing of transactions to users.

The synchronizing server 30 performs a settlement of a commodity transaction processing between mail order retailers and users. The synchronizing server 30 connects the cashier server 14 with the user terminal 20 via a communication network and performs data communication.

As shown in Fig. 14, the virtual cashier terminal 12 in the cashier server 14 is connected to the synchronizing server 30 via the communication line 18 and performs data communication.

The user terminal 20 connects to the carrier server 40 via the radio communication channel 28. The carrier server 40 connects to the synchronizing server 30 via the communication line 38. A direct communicating means does not exist between the virtual casher terminal 12 and the user terminal 20.

The synchronizing server 30 acquires information about the billing of a commodity transaction by communicating to the virtual cashier terminal 12, and information about the paying of a commodity transaction by communicating to the user terminal 20. The synchronizing server 30 processes the

settlement of transactions between the virtual cashier terminal 12 and the user terminal 20 by synchronizing the communication to the virtual cashier terminal 12 with the communication to the user terminal 20.

The other components marked the same as in Fig. 1 will not be described here because these components have the same performance and construction as the first embodiment.

Fig. 15 shows an example of a mail order catalog. A transaction ID in order to identify the mail order retailer and item numbers for each item is written in the catalog. A user checks such a mail order catalog, orders the item, and performs a settlement processing using a user terminal 20.

Referring to Fig. 16 to Fig. 24, processing of the electronic settlement of the present embodiment, which a user settles a payment with the electronic settlement system using a user terminal, is described as follows. Fig. 16 is a flow chart showing a settlement processing in an electronic settlement system of the present embodiment. Fig. 17 to Fig. 24 are flow charts showing details of processing in Fig. 16. Fig. 24 shows examples of information displayed on a display unit 802 of a user terminal 20.

Referring to Fig. 16, processing of the electronic settlement is described as follows. A user starts electronic settlement by choosing a settlement menu from a user terminal 20 (200). Information prompting a user to input a "transaction ID", as shown in Fig. 24(a), is displayed on the user terminal 20. The user inputs the transaction ID listed in a mail order advertisement or a catalog (202). In the present embodiment the transaction ID is a number in order to identify a cashier server 14 performing a mail order distribution.

When the user chooses "send" in the transaction ID input information, the user terminal 20 is connected to the synchronizing server 30. The transaction ID is transmitted to the synchronizing server 30 (204). The user may choose "cancel" in the transaction ID input information if he or she wants to quit the settlement processing. This cancellation processing may be used in a case where the settlement processing may not be performed even when inputting a transaction ID correctly, caused by a communicating disorder and so on.

The synchronizing server 30 receives the transaction ID transmitted from the user terminal 20, and using the transaction ID, makes an inquiry to a cashier data (206).

Referring to Fig. 17, a processing of cashier data inquiry 206 is described as follows. The synchronizing server 30 accesses the cashier database 50 (2062) and retrieves cashier data that matches the transaction ID (2064). Information such as a retailer name, an authentication method, and an access number to the cashier server are registered as cashier data. The authentication method may be chosen from a voice authentication method, a password authentication method, and so on. The cashier data includes authentication methods to be used. The synchronizing server 30 decides to adopt the authentication method registered in the cashier data (2066). Here, a case in which it was decided that a password authentication method is to be adopted as an authentication method is described as follows.

Referring to Fig. 16 again, the synchronizing server 30 next processes the user data inquiry 208. Referring to Fig. 18, the processing of the user data inquiry 208 will be described. The synchronizing server 30 retrieves a user

terminal number from user terminal 20. When the user terminal 20 is a cellular phone, a user terminal number is the calling telephone number. The synchronizing server 30 accesses the user database 60 (2082) and checks if the user terminal 20 is registered based on the user terminal number (2084). When the user terminal is not registered, the synchronizing server 30 transmits to the user terminal 20 a message "you are not registered. " (2086). Information, notifying that the user does not have user registration, shown in Fig. 24(b), is displayed on the user terminal 20. The synchronizing server 30 shuts the connection to the user terminal 20 down (2090) and finishes the processing.

When the user registration is verified, user data is retrieved from the user database 60 (2092). Information about the payment history of the user is recorded in the user data. If the user has a problem in his or her payment history on his or her credit card, or his or her bankcard, and so on, it is checked based on the information (2094). When any problem is found in his or her payment history, a message "we cannot accept your access." is transmitted to the user terminal 20 (2096). Information notifying that settlement is rejected, shown in Fig. 24(c), is displayed on the user terminal 20. The synchronizing server 30 shuts the connection to the user terminal 20 down (2098), and finishes the processing.

Referring to Fig. 16 again, the synchronizing server 30 next processes the password authentication 210. Referring to Fig. 19, the processing of the password authentication 210 will be described as follows. The synchronizing server 30 authenticates the user terminal based on the authentication method decided in the user data inquiry 206. Here, a case that the password authentication is chosen for the

authentication method is described as follows. In order to perform the password authentication, the synchronizing server 30 retrieves data necessary for authentication from the user database 60 and generates authentication data (2102). The synchronizing server 30 initializes a password require count variable n, which stores the password require count, to 0 (2104). The synchronizing server 30 increments n to n+1 (2106) and transmits a password request message to the user terminal 20 (2108). Information shown in Fig. 24(d) is displayed on the user terminal 20. The user inputs the password (2110). The user terminal 20 transmits the password inputted by the user to the synchronizing server 30 (2112). The synchronizing server 30 receives the password transmitted from the user terminal 20 and verifies the password (2114).

When the password transmitted from the user terminal 20 is incorrect, it is checked whether the required password count n is 2 or more (2116), if not, it goes back to the processing of 2106 and requests the password again. If the required password count n is 2 or more, the authentication processing is finished (2118) and an invalid message is transmitted to the user terminal 20 (2120). Because the authentication is not confirmed, information shown in Fig. 24(e) that the settlement service is not available is displayed on the user terminal 20 (2124).

In the password verification 2114, when the synchronizing server 30 verifies the correct password, the processing of the password authentication 210 is finished.

Referring back to Fig. 16 again, the synchronizing server 30 accesses the cashier server 14 using the access number for the cashier server that is retrieved in the processing of the cashier data inquiry 206 (212). The cashier server 14 activates the virtual cashier terminal 12

configured in the cashier server 14 (214). The virtual cashier terminal 12 is an apparatus or a processing working as a cashier terminal, and may be a terminal device provided in the cashier server or a program activated in the cashier server. The virtual cashier terminal 12 accesses the synchronizing server 30 (216).

The synchronizing server 30 creates "link information" (218). The link information includes cashier server identifying information to identify a virtual cashier terminal 12 connected to the synchronizing server 30 and cashier identifying information to identify the cashier server 14, such as the name of the retailer and a welcome message. The synchronizing server 30 sends the link information to the user terminal 20 (220). The user terminal 20, receiving the link information from the synchronizing server 30, displays the welcome message shown in Fig. 24(f) on the display. The user may confirm, by looking at this information, whether the site is the correct mail order site he or she wanted to connect to. When the user chooses "link" on the information, the user terminal 20 transmits a link information confirming signal to the synchronizing server 30 (224). The link information confirming signal includes the cashier terminal identifying information to identify the virtual cashier terminal 12 included in the link information.

When the user chooses "cancel" at this point, the electronic settlement may be canceled. This cancellation processing is performed in such a case that the user inputted a wrong transaction ID and an unwanted mail order site is shown in the display and so on.

The synchronizing server 30 establishes synchronization when a link information confirming signal is received from the user terminal 20 (226). Referring to Fig. 20, a

processing of the synchronization 226 will be described as follows.

The user terminal 20 transmits the link information confirming signal corresponding to the link information sent from the synchronizing server 30, so that the synchronizing server 30 establishes "synchronizing" status.

First, the synchronizing server 30 is on an "access wait" status, that is waiting to be accessed by the user terminal 20 and waiting for a link information confirming signal to be sent. In this "access wait" status, if a user terminal 20 using the same link information to be allocated to the virtual cashier terminal 12 accesses, the synchronizing server 30 establishes one to one "synchronizing" status between that virtual cashier terminal 12 and the user terminal 20, and realizes a synchronization of the communication to the virtual cashier terminal 12 with the communication to the user terminal 20. Access from a plurality of the user terminals 20 will not be matched for one link information.

A time out limit is set up for the "access wait" status of the synchronizing server 30, and limits the access wait period with the user terminal 20 to a predetermined length, for example, 3 minutes. When no answer is obtained for the link information issued from the user terminal 20 until the time out limit, the synchronizing server 30 shuts down the connection to the virtual cashier terminal 12, and initializes it. This time out function is set up in order to avoid trouble for cases where a user cancels the processing or that a communicating condition of the user terminal 20 with the synchronizing server 30 is poor so that data communication cannot be performed normally, and so on.

As shown in Fig. 20, the synchronizing server 30 on the "access wait" status checks if access from the user terminal 20 has existed, and if a link information confirming signal has been sent from the user terminal 20 (2262). If there has been no access, it checks if it exceeds the time out limit (2264), in a case where it exceeds, shuts the connection to the virtual cashier terminal 12 down (2266), and finishes the processing.

When the user terminal 20 transmits the link information confirming signal, it is checked whether a virtual cashier terminal 12 on the "synchronizing wait" status corresponding to that link information is found (2268), if not, it transmits a synchronizing error message to the user terminal 20 (2270). The user terminal 20 displays the synchronizing error message on the display (2272), and then the user terminal 20 shuts the settlement processing down, and finishes the settlement.

When a virtual cashier terminal 12, which corresponds to the link information transmitted from the user terminal 20, is found and on the "synchronizing wait" status, the synchronizing server 30 establishes a "synchronizing" status between that virtual cashier terminal 12 and the user terminal 20 and synchronizes the communication with the virtual cashier terminal 12 and the communication to the user terminal 20 (2274).

Referring back to Fig. 16 again, when the synchronization is established, the synchronizing server 30 sends a synchronizing signal to the virtual cashier terminal 12 (228). The virtual cashier terminal 12 receives the synchronizing signal from the synchronizing server 30 and transmits product information for mail ordering (230). The synchronizing server 30 sends the product information

received from the virtual cashier terminal 12 to the user terminal 20 (232).

The user terminal 20 prompts the user to input to the user terminal 20 an order of an item, based on the product information received from the synchronizing server 30 (234). Referring to Fig. 21, a processing of the order input 234 will be described as follows. Information for an order input as shown in Fig. 24(g) is displayed on the user terminal 20. The user, referring to the mail order catalog shown in Fig. 15, orders an item by inputting an item number (2322). When the user chooses "send" and transmits the item number, information shown in Fig. 24(h) is displayed so that the user may confirm the chosen item. If the user chooses "OK" in Fig. 24(h), the information returns back to Fig. 24(g), and the user may input another order for the next item. If the user chooses "cancel" in Fig. 24(h), that order may be canceled. In the information shown in Fig. 24(g), when the user chooses "end of order", information shown in Fig. 24(i) is displayed and all the ordered items may be confirmed (2324). If the user chooses "OK" in the information shown in Fig. 24(i), the processing of the order input 234 will be finished. If the user chooses "cancel" in the information shown in Fig. 24(i), the orders are canceled and information shown in Fig. 24(j) is displayed (2326), and the user terminal 20 transmits a cancel signal to the synchronizing server 30 (2328). The synchronizing server 30, which receives the cancel signal from the user terminal 20, transmits a cancel signal to the virtual cashier terminal 12. Then, the synchronizing server 30 releases the synchronizing status of the user terminal 20 with the virtual cashier terminal 12 (2332).

Referring back to Fig. 16 again, a processing after the

user terminal 20 has finished the order input 234 processing will be described as follows. The user terminal 20 transmits order information to the synchronizing server 30 (236). The synchronizing server 30 sends order information received from the user terminal 20 to the virtual cashier terminal 12 in the synchronizing status with the user terminal 20 (238).

The virtual cashier terminal 12 calculates a purchase amount based on the order information received from the synchronizing server 30 (240), and transmits to the synchronizing server 30 the purchase amount information including the purchase amount (242). The synchronizing server 30, receiving the purchase amount information from the virtual cashier terminal 12, performs the processing of the available amount checking 244.

Referring to Fig. 22, the processing of the available amount checking 244 will be described as follows. The synchronizing server 30 compares the purchase amount transmitted from the virtual cashier terminal 12 with the available amount limit retrieved from the user database 60 in the user data inquiry 208 (2442), if the purchase amount does not exceed the available amount limit, the inquiry processing is finished. If the purchase amount exceeds the available amount limit, a message "your purchase exceeds your available amount limit" is transmitted to the user terminal 20 (2444). The synchronizing status of the virtual cashier terminal 12 with the user terminal 20 is released (2446). Then, information shown in Fig. 24(k) is displayed on the user terminal 20.

Referring back to Fig. 16 again, the processing after available amount checking 244 is completed will be described. The synchronizing server 30 transmits purchase amount information including the purchase amount to the user

terminal 20 (246). The user terminal 20, receiving purchase amount information from the synchronizing server 30, performs the processing of the final purchase confirmation 248.

Referring to Fig. 23, the processing of the final purchase confirmation 248 will be described as follows. The user terminal 20 displays information shown in Fig. 24(l) in order to display the purchase amount (2462). The user confirms if the purchase amount is correct (2464). If correct, the user chooses "OK" on the display and finishes the processing of the final purchase confirmation 248. If the purchase amount is incorrect, the user chooses "cancel". When the user chooses "cancel", information which shows the settlement is canceled as shown in Fig. 24(m) is displayed on the user terminal 20 (2466), the user terminal 20 transmits a cancel signal to the synchronizing server 30 (2468). The synchronizing server 30, receiving the cancel signal from the user terminal 20, transmits a cancel signal to the virtual cashier terminal 12 (2470). The virtual cashier terminal 12 cancels the settlement, and finishes the processing (2472). The synchronizing server 30, after transmitting the cancel signal to the virtual cashier terminal 12, releases the synchronization of the communication to the virtual cashier terminal 12 with the communication to the user terminal 20, and finishes the processing (2474).

Referring back to Fig. 16 again, the processing after final purchase confirmation 248 is finished will be described. The user terminal 20 transmits a final purchase confirmation signal to the synchronizing server 30 (250). The synchronizing server 30, receiving the final purchase confirmation signal from the user terminal 20, accesses the user account database 70 and performs the settlement processing which records the purchase information (252).

When the settlement is completed, the synchronizing server 30 transmits a settlement completion notification to the virtual cashier terminal 12 (254), and transmits a receipt to the user terminal 20 (258). The virtual cashier terminal 12 confirms the completion of the settlement and finishes the synchronizing settlement (256). The user terminal 20 displays information shown in Fig. 24(n) of the completion of the settlement (152).

An electronic settlement system of the present embodiment enables users electronic ordering and payment of mail orders including magazines, catalogs, and so on. The user may confirm if he or she is connected to the mail order site he or she wanted before performing his or her order with the link information displayed on the portable terminal. The retailer of mail order may specify the authentication method so that the settlement may be performed after the authentication of the user with the user password and so on.

(Third Embodiment)

An electronic settlement system according to the third embodiment of the present invention will be described as follows. Applying the electronic settlement system of the present embodiment, as the second embodiment, a user may order items and perform settlement via a network. The electronic settlement system of the present embodiment adopts voice authentication for the authentication method for user authentication. The rest of the embodiment is almost the same as the second embodiment.

Fig. 25 is a block diagram showing a configuration figure of an electronic settlement system of the present embodiment. The electronic settlement system of the present embodiment has a virtual cashier terminal 12 as an example of

a billing terminal, a cashier server 14 which includes a plurality of virtual cashier terminals 12, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement apparatus, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, a user account database 70, a voice authentication center 42, and a user voice database 44.

The voice authentication center 42 connects to the carrier server 40. When a user terminal 20 dials via a radiotelephone communication, the voice authentication center 42 authenticates the user by the voice from the user terminal 20. The voice authentication center 42 has a user voice database 44, and inquires a user voice from the user terminal 20 to the user voice registered in advance in the user voice database 44. The user voice database 44 stores voice information registered by the user of the user terminal 20 in advance. The voice information of the user is, for example, the voice data of a predetermined registered word the user speaks.

The voice authentication center 42 connects to the cashier database 50 and the user database 60, and checks registration status and payment history of the user. The voice authentication center 42 may also retrieve the cashier server registered in the cashier database 50 based on the transaction ID the user transmitted, and checks the registration of the cashier server.

The other components marked the same as in Fig. 14 will not be described here because these components have the same performance and construction as the second embodiment.

Referring to Fig. 26 to Fig. 29, processing of the

electronic settlement of the present embodiment is described as follows.Fig. 26 is a flow chart showing the settlement processing according to the electronic settlement system of the present embodiment. Figs. 27 to Fig. 29 show detailed flow charts of the processing in Fig. 26.

A difference of the present embodiment from the second embodiment is that the user terminal 20 is connected to the voice authentication center 42 via the carrier server 40 when a user terminal 20 chooses the synchronizing settlement menu and starts a settlement, and a voice authentication is performed. Other processing's are the same as the second embodiment. Here, the processing that is different from the second embodiment will be described.

First, the user chooses the electronic settlement menu from the user terminal 20 and starts an electronic settlement (300). Information directing the user to input an "ordering telephone number" is displayed on the user terminal 20. The user inputs an "ordering telephone number" listed in an advertisement of a mail order or a catalog (302), and a telephone call is made (304). "Ordering telephone number" is a telephone number of the voice authentication center 42. The user terminal 20 is connected to the voice authentication center 42 with a telephone communication line. Information from the user terminal 20 to the voice authentication center 42 is transmitted by voice or inputted by keypad. Information from the voice authentication center 42 to the user terminal 20 is sent by voice direction or voice guidance providing information.

When the voice authentication center 42 receives a telephone call from the user terminal 20, the voice authentication center 42 inquires the user data (306). Referring to Fig. 27, a processing of user data inquiry 306

is described as follows. The voice authentication center 42, receiving the telephone call from the user terminal 20, detects a user terminal number of the user terminal 20 (3060).

An example of the user terminal number of the user terminal 20 is a calling telephone number. When the user terminal 20 is set a calling number delivery service, the receiver may detect the calling telephone number. When the user terminal 20 does not set a calling number delivery service, the receiver may not detect the calling telephone number. In such a case the voice authentication center 42 sends to the user terminal 20 a voice guidance prompting the user to set the calling number delivery service of the user terminal 20.

The voice authentication center 42 accesses the user database 60 (3062), and checks if the user terminal 20 has registered based on the user terminal number (3064). If the user terminal 20 does not have a user registration, the voice authentication center 42 transmits to the user terminal 20 voice guidance notifying the user terminal 20 is not registered in the database (3066), shuts down the connection to the user terminal 20 (3068), and finishes the processing.

When the user registration is verified, the user data is retrieved from the user database 60 (3070). Information about payment history of the user is recorded in the user data. The voice authentication center 42 checks if the user has a problem in his or her payment history on his or her credit card or his or her bankcard based on the information (3072). When any problem is found in his or her payment history, the voice authentication center 42 transmits the user terminal 20 voice guidance to notify that the authentication service is not available (3074), shuts the

connection to the user terminal 20 down (3076), and finishes the processing. When the user has no problem with his payment history, the voice authentication center 42 finishes the processing of the user data inquiry 306, and goes to the next step.

Referring back to Fig. 26, the voice authentication center 42, after the processing of the user data inquiry 306, performs the processing of voice authentication 308. Referring to Fig. 28, the processing of the voice authentication 308 will be described as follows. The voice authentication center 42 accesses the user voice database 44 (3080), and detects user voice information for the user of the user terminal 20 from the user voice database 44 based on the user terminal number of the user terminal 20 previously detected (3082). The user voice information is voice data of a predetermined registered word the user speaks. A registered word require count variable n, which stores the registered word require count, is initialized to 0 (3084). The registered word require count is incremented from n to n+1 (3086). A voice guidance requiring the user to speak the word, which is previously registered, is transmitted to the user terminal 20 (3088). This voice guidance may be a voice message that says, "Please speak the registered word clearly after the beep. When finished, please push □.". The user terminal 20 receives this voice guidance. The user speaks the registered word, so that the voice of the user is input to the user terminal 20 (3090). The spoken user voice is transmitted to the voice authentication center 42 (3092). The voice authentication center 42 verifies the voice of the registered word transmitted from the user terminal 20 to the user voice of the registered word retrieved from the user voice database 44(3094). When the voice transmitted from the user terminal 20 and the user voice retrieved from the user

voice database 44 are judged to be the same by the voice verification, the processing of the voice authentication 308 is finished. In a case where the user terminal 20 does not match the registered user voice by the voice verification, the voice authentication center 42 checks whether the registered word require count n exceeds 2 (3096), if n does not exceeds 2, it goes back to the processing 3086, and repeats the request of the registered word. In a case that n exceeds 2, the voice authentication is invalid (3098), transmits voice guidance to the user terminal 20 (3100) notifying that the voice authentication is invalid, and finishes the processing.

Referring back to Fig. 26, the voice authentication center 42, finishing the processing of the voice authentication and having succeeded the user voice authentication, transmits voice guidance that prompts the user to input the transaction ID to the user terminal 20 (310). This voice guidance may be a voice message such as "You are authenticated. Please input a transaction ID.". The user inputs the transaction ID from the user terminal 20 (312). In the present embodiment, the transaction ID is a number to identify a cashier server 14 performing the mail order merchandise.

The input transaction ID is transmitted to the voice authentication center 42 (314). The voice authentication center 42 makes an inquiry to the cashier data based on the transaction ID received from the user terminal 20 (315). Fig. 29 shows the details of the cashier data inquiry 315. The processing of the cashier data inquiry 315 will be described as follows. The cashier database 50 is accessed (3182), and checked to see whether a cashier server corresponding to the transaction ID is registered (3184).

When a cashier server 14 is not registered, voice guidance notifying that the cashier server corresponding to the transaction ID that is not able to find is transmitted to the user terminal 20 (3186). A voice message saying "We cannot find the cashier you have chosen" is sent to the user terminal, and it goes back to the input transaction ID 312 processing. A situation that the cashier server 14 corresponding to a transaction ID cannot be found may happen when the user input an incorrect transaction ID or when a transaction ID of the mail order retailer has passed the expiry date.

When the cashier server corresponding to the transaction ID is registered, the cashier data is retrieved (3188). Information such as a retailer name, an authentication method, and an access number to the cashier server 14 are registered as cashier data. An access number of the cashier server 14 is retrieved from the cashier data. The access number is, for example, a connecting telephone number of the cashier server 14. When the cashier data is retrieved, the voice guidance confirming the cashier data is transmitted to the user terminal 20. For example, voice message "OO mail order catalog July is chosen. If correct, please hang up and wait for a call back from the ordering center. If incorrect, please input the transaction ID again" is sent to the user terminal 20.

Referring back to Fig. 26, the voice authentication center 42, after the processing of the cashier data inquiry 315, transmits an order receiving instruction and sends the transaction ID to the synchronizing server 30. The voice authentication center 42 transmits voice guidance "please hang up and wait for a message from the ordering center" to the user terminal 20. The telephone connection between the

voice authentication center 42 and the user terminal 20 is shut down (316).

The synchronizing server 30 receives an order receiving instruction from the voice authentication center 42 and receives the transaction ID (316). The synchronizing server 30 accesses the cashier server 14 corresponding to the transaction ID (320). The cashier server 14 activates a virtual cashier terminal 12 (322). The virtual cashier terminal 12 is an apparatus or a processing performing as a cashier. The virtual cashier terminal 12 may be a terminal device provided in the cashier server, or may be a program activated in the cashier server. The virtual cashier terminal 12 is connected to the synchronizing server 30 (323).

The synchronizing server 30, when the server connects to the virtual cashier terminal 12, creates a "link information" in order to identify a transaction to the virtual cashier terminal 12 (324). The link information in the present embodiment is an example of transaction identifying numbers that identify the transaction between the user terminal 20 and the virtual cashier terminal 12. The synchronizing server 30 synchronizes the communication to the user terminal 20 with the communication to the virtual cashier terminal 12 based on the link information, and processes the settlement of the transaction. The link information includes not only the transaction identifying number but also cashier identifying information that identifies a cashier server 14 such as a name of a mail order retailer or a welcome message.

The synchronizing server 30 sends the link information to the user terminal 20 (326). The user terminal 20, receiving the link information from the synchronizing server

30, displays a welcome message on the screen as shown in Fig. 24(f) of the second embodiment. The user, looking at the information, confirms whether the present site is the site he or she wants to connect to (328). When the user chooses the "link" on the display, the user terminal 20 transmits a link information confirming signal to the synchronizing server 30 (330). The link information confirming signal includes the cashier terminal identifying signal which is included in the link information in order to identify the virtual cashier terminal 12.

The user, choosing "cancel" on the display, may cancel the electronic settlement. This cancellation processing is performed in such a case where the user inputs an incorrect transaction ID, an unwanted mail order site is displayed.

The synchronizing server 30, receiving the link information confirming signal from the user terminal 20, establishes a synchronization (332).

The settlement processing after the synchronization processing (332) will not be described here, as the processing are the same as the first embodiment.

Here, in the present embodiment, the voice authentication center 42 performs the processing of cashier data inquiry 315 processing and transmits the transaction ID to the synchronizing server 30. As another case, at the point of the processing when the user voice authentication 308 processing is completed, the voice authentication center 42 may transmit the information of the completion to the synchronizing server 30. In this case, the synchronizing server 30 performs the processing from the voice guidance transmission 310 processing to the cashier data inquiry 315 processing.

The electronic settlement system of the present embodiment authenticates a user by his or her voice before the electronic settlement, so that may ensure a high quality authentication.

(Fourth Embodiment)

The electronic settlement system according to the fourth embodiment of the present invention will be described as follows. Applying the electronic settlement system of the present embodiment, as the second embodiment, a user may order items and perform settlement via a network. The electronic settlement system of the present embodiment adopts image authentication for an authentication method for user authentication. The rest of the embodiment is almost the same as the second embodiment.

Fig. 30 is a block diagram showing a configuration of an electronic settlement system of the present embodiment. The electronic settlement system of the present embodiment has a virtual cashier terminal 12 as an example of a billing terminal, a cashier server 14 which includes a plurality of virtual cashier terminals 12, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement apparatus, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, a user account database 70, an image authentication center 46, and a user image database 48.

The image authentication center 46 authenticates a user based on an image transmitted from the user terminal 20. The image authentication center 46 has a user image database 48, and verifies an image transmitted from the user terminal 20 with the user image previously registered in the user image

database 48. Image data of a user's facial portrait, image data of an iris or a retina of the user, or image data of a user's fingerprint may be used for the user image. The user registers this image data as authentication data in the user image database 48 in advance.

Fig. 31 shows a configuration of a portable terminal that includes communication facilities as an example of a user terminal 20 applying the present embodiment. The portable terminal 90 may connect to a cellular phone 92 and wirelessly communicate to networks. The portable terminal 90 may read in the user facial portrait image by connecting a CCD camera 94 or reading in a user fingerprint by connecting to a finger print scanner 96. The portable terminal 90 may include a wireless communication facility working as a cellular phone 92, a scanning function working as a CCD camera 94, and a fingerprint scanning function working as a finger print scanner 96 inside the portable terminal 90.

The other components marked the same as in Fig. 14 will not be described here because these components have the same performance and construction as the second embodiment.

Fig. 32 is a flow chart showing the settlement processing applying the electronic settlement system of the present embodiment. In Fig. 32, the processing and communications marked the same as in Fig. 14 will not described here because they are the same as the second embodiment. The processing of a user image data authentication 211, which is different from the second embodiment, will be described here.

Fig. 33 is a flow chart showing the processing of the user image data authentication 211. The synchronizing server 30 performs authentication of a user based on an

authentication method decided from the cashier terminal information inquiry 206. The authentication method may be one of the following authentications, which use personal image information to identify the user as an individual; a facial portrait image authentication, an authentication using an image of an iris or a retina, an authentication using a finger print image, and so on. The synchronizing server 30, in order to perform image authentication, accesses the user image database 48 (2700) and retrieves user image data necessary for authentication and generates the authentication data (2702). The synchronizing server 30 initializes image data require count variable n, which stores the image data require count, to 0 (2704). The synchronizing server 30 increments n to n+1 (2706), and transmits an image data request message to the user terminal 20 (2708). Information prompting the user to input the image information such as a facial portrait image, an iris or retina image, or a finger print image of the user to the user terminal 20 is displayed on the user terminal 20. The user, using the CCD camera 94 or the finger print scanner 96 attached to the user terminal 20 and so on, inputs image data to the user terminal 20(2710). The user terminal 20 transmits the image data inputted by the user to the synchronizing server 30 (2712). The synchronizing server 30 receives the image data transmitted from the user terminal 20, and makes an inquiry to the image data retrieved from the user image database 48 (2714).

If the image data transmitted from the user terminal 20 is not matched with the image data retrieved from the user image database 48, whether the image data require count n is 2 or more is checked (2716). If it is not 2 or more, it goes back to the processing 2706 and requests the image data again. If the image data require count n is 2 or more, the

authentication processing is finished (2718) and an invalid message is transmitted to the user terminal 20 (2720). As the authentication is not confirmed, information indicating that the settlement service is not available is displayed on the user terminal 20 (2724).

In the image data verification 2714, when the synchronizing server 30 verifies that the image data has been transmitted from the user, the processing of the user image data authentication 211 is finished.

The electronic settlement system of the present embodiment may ensure a safe electronic settlement by prompting the user to transmit the image data that identifies an individual such as a facial portrait, iris or retina, or finger print in order to authenticate the user. With the image authentication, different from voice authentication that needs to connect a cellular phone to an audio carrier, the authentication and the settlement may be performed in succession using a data packet communication facility of a cellular phone.

(Fifth Embodiment)

The electronic settlement system applying the fifth embodiment of the present invention will be described in the following. Applying the electronic settlement system of the present embodiment, when the user purchases an item using a vending machine, the user may perform a settlement electronically via a network.

Fig. 34 is a block diagram showing a configuration of an electronic settlement system applying the fifth embodiment of the present invention. The electronic settlement system of the present embodiment has a vending machine 16 as an

example of a billing terminal, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement device, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, and a user account database 70.

The vending machine 16 may connect to the synchronizing server 30 via a communication path. A communication means from the vending machine 16 to the synchronizing server 30 may be at least one of the followings: a communication using a commercial telephone line, a communication using a private line, and a communication using radiotelephone communication.

The rest of the components have the same numbers as Fig. 1. Here, these components have the same performance and construction as the first embodiment and will not be described.

Fig. 35 shows a configuration figure of a vending machine 16. The vending machine 16 has a plurality of keys 900 to choose an item, an operating unit 902 operating electronic settlement, a coin-inserting unit 904 to insert coins, and an item collection unit 906. The electronic settlement operating unit 902 has a display unit 908 displaying processing of the electronic settlement, a start key 910 directing the start of the electronic settlement, and a cancel key 912 directing the cancellation of the electronic settlement.

Referring to Fig. 36 and Fig. 37, settlement processing in the electronic settlement system applying the present embodiment will be described in the following. Fig. 36 is a flow chart showing a settlement processing in an electronic settlement system applying the fifth embodiment of the

present invention. Fig. 37 shows examples of information indicated on a display unit 802 of a user terminal 20.

Referring to Fig. 36, the settlement processing will be described in the following. The user chooses the electronic settlement menu of the user terminal 20 (401), selects the start key 910 of the vending machine 16, so that the electronic settlement (400) starts. The vending machine 16 accesses the synchronizing server 30 (402). The vending machine 16 transmits to the synchronizing server 30 a cashier registration number that is unique to the vending machine 16.

The synchronizing server 30, corresponding to the access from the vending machine 16, starts to communicate with the vending machine 16. The synchronizing server 30 inquires the cashier terminal information based on the cashier registration number transmitted from the vending machine 16 (404). The processing from the cashier terminal information inquiry 404 processing to the user information inquiry 428 processing is the same as the processing from the cashier terminal information inquiry 104 processing to the user information inquiry 128 processing of the first embodiment shown in Fig. 5; therefore it will not be described here. In the synchronization indicating 420 processing, the vending machine 16 may have a synchronization indicator to light the synchronization indicator, or may indicate the synchronizing status by displaying characters on the display unit 908.

The synchronizing server 30 transmits a selling order to the vending machine 16 after the user information inquiry 428 (430). The vending machine 16, receiving the selling order from the synchronizing server 30, prompts the user to choose an item sold by the vending machine (432). When the user chooses an item, the vending machine 16 transmits to the

synchronizing server 30 the purchase amount information (434).

The processing from the available limit inquiry 436 processing to the settlement processing 444 is the same as the processing from the available limit inquiry 136 processing to the settlement processing 144 of the first embodiment shown in Fig. 5; therefore it will not be described here.

When the settlement processing 444 is finished, the synchronizing server 30 notifies a settlement completion notification to the vending machine 16 (446). The vending machine 16 sends out the item that the user has chosen (448). The synchronizing server 30 transmits a receipt indicating the reception of the expense to the user terminal 20 (452). The user terminal 20 indicates the receipt (454).

The data communication of the vending machine 16 with the synchronizing server 30 as described above is all performed via the communication line 18. The data communication of the user terminal 20 with the synchronizing server 30 is performed via the radio communication channel 28 or the communication line 38. The data communication of the vending machine 16 with the user terminal 20 does not exist.

The vending machine 16 notifies the transaction ID from the vending machine 16 to the user terminal 20 (410) by displaying the transaction ID on the display unit. As another case of the embodiment, the vending machine 16 has an infrared communication unit as an example of a short range communication unit, in the notification of the transaction ID from the vending machine 16 to the user terminal 20 (410) processing, the transaction ID is transmitted from the infrared communication unit of the vending machine 16 to the

infrared communication unit 808 of the user terminal 20 through the infrared communication. Thus, the user does not need to input the transaction ID to the user terminal 20 and a miss-input of the transaction ID may be avoided. Furthermore, as a means to transmit the transaction ID from the vending machine 16 to the user terminal 20, each of the vending machines 16 and the user terminals 20 has a wireless communication unit as an example of the short range communication unit. Using a wireless communication for portable apparatuses such as Blue tooth, the vending machines 16 and the user terminals 20 transmit and receive the transaction ID.

The electronic settlement system of the present embodiment differs from the first, second, third, and fourth embodiments because it does not perform the authentication of the user such as the visual authentication, the password authentication, the voice authentication, the iris or retina image authentication, the fingerprint authentication, and so on. A settlement using the vending machine 16 settles only a smaller amount, and the need for user authentication is less important. When a cellular phone is used for the user terminal 20, the uniqueness of the calling number of a cellular phone authenticates the user, as long as the owner of the cellular phone oneself uses the cellular phone. In the case of settlement for the smaller amount, the user authentication processing may be omitted without significant problems. Therefore, the electronic settlement system applying the present invention may select the authentication method depending on the purchase amount, selling style, and so on.

(Sixth Embodiment)

The electronic settlement system applying the sixth

embodiment of the present invention will be described in the following. Applying the electronic settlement system of the present embodiment, a user may access the Internet using a computer, access an on-line shopping server on the Internet, purchase an item, and settle the value of the merchandise.

Fig. 38 is a block diagram showing a configuration of an electronic settlement system applying the sixth embodiment of the present invention. The electronic settlement system of the present embodiment has a cashier terminal 14, a plurality of virtual cashier terminals 12 as examples of billing terminals, a user terminal 20 as an example of a paying terminal, a synchronizing server 30 as an example of a settlement device, a carrier server 40, a cashier database 50 as an example of a billing terminal database, a user database 60 as an example of a paying terminal database, a user account database 70, a shopping server 24, and a user computer 22.

The shopping server 24 is an on-line shopping server on the Internet 26. The user computer 22 is a user computer that connects to the Internet 26, and may access the shopping server 24 and perform the on-line shopping.

The components have the same numbers as in Fig. 14 and are the same as the second embodiment. Here, these components that have the same performance and construction as the second embodiment will not be described.

Referring to Figs. 39 to Fig. 44, applying the electronic settlement system of the present embodiment, settlement processing of the electronic settlement performed by the user using the user terminal is described in the following. Fig. 39 is a flow chart showing a settlement processing in an electronic settlement system applying the

fifth embodiment of the present invention. Figs. 40 to 43 are flow charts showing processing of details in Fig. 39. Fig. 44 shows examples of information indicated on the user computer 22.

The user connects to the Internet 26 using the user computer 22, accesses the shopping server 24 on the Internet 26, and performs the on-line shopping. While on-line shopping, checking a web page on the Internet 26 for shopping in the shopping server 24, the user chooses an item. When the user has chosen the item, a web page shown in Fig. 44(a), which shows the chosen item and a purchase amount, is indicated on the display unit of the user computer 22. The user selects a key to direct the synchronizing settlement. Here, the synchronizing settlement processing is started (500). The user computer 22 accesses the cashier server 14, and transmits to the cashier server 14 purchase amount information including the purchase amount (502).

The cashier server 14 activates the virtual cashier terminal 12 (504). The virtual cashier terminal 12 is one of processing and an apparatus working as a cashier terminal. The virtual cashier terminal 12 may be one of a terminal device provided in the cashier server 14 and a program activated in the cashier server 14. The virtual cashier terminal 12 connects to the synchronizing server 30, sets a transaction ID as an example of a transaction identifying number which identifies the transaction, and transmits the transaction ID to the synchronizing server 30 (506).

The synchronizing server 30 starts the connection to the virtual cashier terminal 12 corresponding to the access from the virtual cashier terminal 12, and inquires cashier information based on the cashier registration number transmitted from the virtual cashier terminal 12 (508). Fig.

40 is a flow chart showing the cashier information inquiry 508 processing. The cashier information inquiry 508 processing is the same as the cashier information inquiry 206 processing of the second embodiment shown in Fig. 17 therefore it will not be described here.

The cashier server 14 creates link information (510), and transmits the link information to the user computer 22 (512). The information shown in Fig. 44(b), which is created by cooperative processing with the cashier server 14, is indicated on the user computer 22. CGI (Common Gate Interface) may be used for coordinating the processing of the user computer 22 and the cashier server 14. The information shown in Fig. 44(b) includes "purchase detail" and "synchronizing".

When the user chooses "purchase detail", a list of purchased items and a purchase amount is indicated, so that the user may confirm the details of the purchase and purchase amount. "Synchronizing" is attached with the "link information" to the virtual cashier terminal 12 in the cashier server 14. Thus, the user computer 22, choosing " Synchronizing", may connect to a predetermined virtual cashier terminal 12 in the cashier server 14 (514).

When the user chooses" Synchronizing", the user computer 22 connects to the virtual cashier terminal 12, and transmits the link information confirmation signal to the virtual cashier terminal 12 (516). The virtual cashier terminal 12, receiving the link information confirmation signal from the user computer 22, transmits the set transaction ID to the user computer 22 (518). Receiving the transaction ID from the virtual cashier terminal 12, in the user computer 22 as shown in Fig. 44(c), a window for the cashier browser is activated. A virtual cashier terminal is

displayed in the window of the cashier browser and a direction to input the transaction ID is displayed (520).

The user computer 22, indicating the transaction ID in the window of the cashier browser, notifies the user of the transaction ID (522). The user inputs to the user terminal 20 the transaction ID indicated in the window of the cashier browser of the user computer 22 (524). The user terminal 20 transmits the transaction ID inputted by the user to the synchronizing server 30 (526).

The synchronizing server 30 verifies the transaction ID received from the virtual cashier terminal 12 in the processing 506 and the transaction ID received from the user terminal 20 in the processing 526. If these transaction IDs match, the synchronizing server 30 synchronizes the communication to the virtual cashier terminal 12 with the communication to the user terminal 20. Fig. 41 is a flow chart showing a cashier number inquiry 528 processing. The cashier number inquiry 528 processing is the same as the transaction ID inquiry 116 in the first embodiment shown in Fig. 7, therefore it will not be described here.

When the transaction ID inquiry is completed, the synchronizing server 30 transmits the synchronizing signal to the virtual cashier terminal 12 (530). The virtual cashier terminal 12, receiving the synchronizing signal from the synchronizing server 30, transmits to the user computer 22 the synchronizing signal (532). The user computer 22, receiving the synchronizing signal from the virtual cashier terminal 12, lights a synchronization indicator displayed in the virtual cashier terminal indicated in the cashier browser (534). Thus, the user may confirm the synchronizing status with the virtual cashier terminal 12.

The synchronizing server 30, after the transaction ID inquiry 528 processing, performs the user information inquiry 536 processing and the password authentication 538 processing. The user information inquiry 536 processing shown in Fig. 42 is the same as the user information inquiry 128 processing of the first embodiment shown in Fig. 8, therefore it will not be described here. The password authentication 538 processing shown in Fig. 43 is the same as the password authentication 210 processing of the first embodiment shown in Fig. 9, except including no visual authentication, therefore it will not be described here.

After the password authentication 538 processing, the synchronizing server 30 performs available limit inquiry 540 processing and the settlement 548 processing; and the user terminal 20 performs final purchase confirmation 544 processing. The processing is the same as the first embodiment, therefore it will not be described here.

The synchronizing server 30, after the settlement processing 548, transmits the settlement completion notification to the virtual cashier terminal 12 (550) and transmits a receipt to the user terminal 20. The virtual cashier terminal 12, receiving the settlement completion notification from the synchronizing server 30, transmits to the user computer 22 the settlement completion notification (552). The user computer 22 indicates notification of the settlement completion on the displayed information. The user, looking at the notification, may know when the settlement is completed with the virtual cashier terminal 12.

In the electronic settlement system of the present embodiment, the user, using a computer, accesses an on-line shopping server on the Internet, selects purchase items, and settles the merchandise transaction using a user terminal

such as a cellular phone.

Using on-line shopping on the Internet, sending a credit card number as data via the Internet may cause a security problem. Conventionally, using a hyper enciphering method, the credit card number is sent in the enciphered code. Applying the electronic settlement system of the present embodiment, the selection of the purchasing item is performed on the Internet, but the settlement of merchandise value is performed safely using the cellular phone and so on. The electronic settlement system of the present embodiment does not need to directly send the personal information such as user identifying information or credit card information between the user terminal paying the settlement and the cashier terminal billing the settlement. Therefore, the user need not worry about personal information being leaked to the retailer, and privacy is protected.

(Seventh Embodiment)

The synchronizing server 30, as an example of the settlement apparatus in the electronic settlement system according to the first, second, third, fourth, fifth, and sixth embodiments, may be realized using a general-purpose computer. Fig. 45 is a block diagram showing a hardware configuration of a general-purpose computer 600. As shown in Fig. 45, a CPU 602 of the computer 600 is operated based on the programs stored in a ROM 604 and a RAM 606. Using an input device 608, an administrator of the synchronizing server 30 may input data or commands. Programs and setting information to operate the CPU 602 are stored in a hard disk drive 610 as an example of a storing device.

A floppy disk drive 614 reads data or programs from a floppy disk 624 and provides them to the CPU 602. A CD-ROM

drive 616 reads data or programs from a CD-ROM 626 and provides them to the CPU 602. A first communication interface 618 connects to a communication line 18 and communicates data. A second communication interface 620 connects to a communication line 38 and communicates data. A database interface 612 connects to databases 622 and communicates data with the database. Furthermore, the synchronizing server 30 has an interface to connect with a display 628 so that the administrator may watch an operational status of the synchronizing server 30, and check the setting information using the display 628.

Fig. 46 is a block diagram showing a functional configuration of the software operating the CPU 602 shown in Fig. 45. This software is provided to users stored in a recording media such as a floppy disk 624 or a CD-ROM 626 and so on. The software stored in the recording media may be compressed or non-compressed. The software may be installed from the recording media to the hard disk drive 610, read out to the RAM 606, and executed by the CPU 602.

The software to be provided stored in the recording media, that is the software installed in the hard disk drive 610, for its functional configuration, has a settlement processing module 640, a first communication module 642, a second communication module 644, and a database retrieving module 646.

The processing, performed by the CPU 602 operating the computer 600, of the settlement processing module 640, the first communication module 642, the second communication module 644, and the database retrieve module 646, is the same as each of the settlement processing unit 80, the first communication unit 82, the second communication unit 84, and the database retrieving unit 86 in the synchronizing server

30 according to the first, second, third, fourth, fifth, and sixth embodiments; therefore these processing's will not be described here.

At least one of the floppy disk 624 and CD-ROM 626 shown in Fig. 45, as an example of the recording media, may store a part of, or all of, the function for the operation of the synchronizing server 30 as an example of the settlement apparatus applying the entire embodiment described in the present application. Furthermore, the synchronizing server 30 may replace a part of the operation of the cashier terminal 10 and the synchronizing server 30 may operate a part of the operation of the cashier terminal 10 of the above described embodiments. In such a case, the part of the operation of the cashier terminal 10 described in the above embodiments may be stored in the floppy disk 624 or the CD-ROM 626.

These programs may be read from the recording media to RAM directly and executed. These programs may be installed to the hard disk drive once, then read to RAM and executed. Furthermore, these above described programs may be stored in a single recording medium or a plurality of recording media. In other cases, these programs may be stored in an encoded form.

Besides a floppy disk and a CD-ROM, the following media may be used for a recording media; an optical recording media such as a DVD, a magnetic recording media such as an MD, a magnetic optical recording media such as a PD, a tape device, a semiconductor memory such as an IC card or a miniature card, and so on. In other cases, using a storage device such as a hard disk or a RAM provided in a server system for a recording media, connected to a private communication network or the Internet, the programs may be provided to the

synchronizing server 30 via a communication network. Such recording media are used only for manufacturing the synchronizing server 30, so that it is obvious that manufacturing and distribution of such recording media as vocation constructs infringement of a patent based on the present application.

As described above, applying the electronic settlement system of the first embodiment, a clerk of the retailer authenticates the user with facial portrait data. In a case of an expensive settlement or the clerk is not able to ensure the user authentication, the clerk further requests the user to input a password, so that accuracy of authentication may be improved corresponding to the importance of a situation. The user, using a portable apparatus having a wireless communication function such as a cellular phone or a portable terminal, may settle a transaction simply, conveniently, and safely.

According to the electronic settlement system of the second embodiment, the user, who reads a magazine, a mail order catalog and so on, may order items and execute settlement electronically. The user also may confirm if the connected site is the correct mail order site he or she wanted by the link information displayed on his or her portable terminal before confirming his or her order. The retailer of the mail order, by appointing the authentication method, may settle after the user is authenticated by a password and so on.

According to the electronic settlement system of the third embodiment, the electronic settlement is performed after the user is authenticated with his or her voice. Thus, high accuracy authentication is ensured.

According to the electronic settlement system of the fourth embodiment, authentication of the user is performed by letting the user transmit identifying information image data of the user as an individual such as a facial portrait, an iris, a retina, or a fingerprint. Security of the electronic settlement is ensured. Applying image authentication, which differs from the voice authentication, using a data packet of communication facility attached to the cellular phone, a cellular phone does not need to be connected to the voice carrier, so that the authentication and the settlement may be performed in succession.

Applying the electronic settlement system of the fifth embodiment, the purchase and settlement using the vending machine may be performed simply and conveniently via networks.

Applying the electronic settlement system of the sixth embodiment, the user, using a computer, accesses the on-line shopping server in the Internet and selects a purchasing item. The user may settle the value of the purchased item using the user terminal such as a cellular phone. The selection of the purchasing item is performed on the Internet. The settlement of the value of purchase may be performed safely, using a cellular phone and so on. The user does not need to worry about personal information being leaked to the mail order retailer, so that privacy is protected.

The electronic settlement system of the present invention has the following advantages for retailers, mail order retailers, or on-line shopping retailers using the Internet. Based on the uniqueness of the calling telephone number of a cellular phone, a secure user authentication may be ensured. On the other hand, because the system has a

selection of authentication methods, the accuracy of the authentication may be easily varied corresponding to a settlement amount or a situation of the settlement. In a case of a small amount settlement such as a purchase at a vending machine, omitting the user authentication, the system may authenticate the user based on the calling telephone number of the cellular phone and perform the settlement. In a case of a larger amount settlement such as a purchase at a jewelry store, the clerk may authenticate the user using facial portrait data, if the clerk is not sure enough, combining further authentication and so on, the accuracy of the authentication may be improved.

The electronic settlement system of the present invention has the following advantage for users. Carrying a cellular phone, which is a communication terminal with a very good portability, a transaction may be electronically settled anytime and anywhere; therefore the user does not need to carry cash, a credit card, a bank card, an IC money card, and so on. Furthermore, the user, using a data packet communication facility of the cellular phone, may check if the payment is withdrawn from his or her account, his or her available amount, his or her purchase history, and so on.

The electronic settlement system of the present invention has the following advantage for a credit card company. Applying the authentication method using a cellular phone may discourage a false use of stolen cards. Because a credit settlement may be performed electronically using a cellular phone, issuing a credit card or management of a credit card is no longer needed; costs may be reduced. Furthermore, using a combination authentication method, even in a case that a person responsible in the credit card company and so on moved data falsely, settlement accounts of

users may be protected from false use.

Although the present invention has been described by way of exemplary embodiments, it should be understood that many changes and substitutions may be made by those skilled in the art without departing from the spirit and the scope of the present invention which is defined only by the appended claims.

Industrial Applicability

It is obvious from the above description, according to the present invention, a settlement of a commercial transaction may be performed safely and conveniently via a communication network.

WHAT IS CLAIMED IS:

1. An electronic settlement system for settling a transaction through a communication network, comprising:

a settlement apparatus which performs the settlement of the transaction;

a billing terminal connecting to said settlement apparatus via the communication network; and

a paying terminal, connecting to said settlement apparatus via the communication network,

wherein said settlement apparatus performs the settlement of a transaction by synchronizing a communication to said billing terminal with a communication to said paying terminal when said settlement apparatus sets up a transaction identifying number which identifies the transaction and when said paying terminal transmits the same transaction identifying number to said settlement apparatus.

2. An electronic settlement system as claimed in claim 1, wherein said billing terminal connects to said settlement apparatus via a commercial telephone line or a private line, and said paying terminal connects to said settlement apparatus via a radiotelephone communication.

3. A settlement apparatus performing a settlement of a transaction, which communicates with a billing terminal performing billing of the transaction and with a paying terminal performing paying of the transaction, the apparatus comprising:

a first communication unit connecting to the billing terminal via a first communication network;

a second communication unit connecting to the paying terminal via a second communication network; and

a processing unit for processing the settlement of the

transaction, said processing unit synchronizing a communication to the billing terminal with a communication to the paying terminal when said processing unit sets up a transaction identifying number to identify the transaction, and when the paying terminal transmits to said settlement apparatus the same transaction identifying number.

4. A settlement apparatus as claimed in claim 3, wherein said first communication unit connects to the billing terminal via at least one of a commercial telephone line and a private line, and said second communication unit connects to the paying terminal via radiotelephone communication.

5. A settlement apparatus as claimed in claim 4, wherein:

said first communication unit receives a purchase amount of the transaction from the billing terminal;

said second communication unit transmits said purchase amount to the paying terminal so that the paying terminal confirms said purchase amount, and receives a final purchase confirmation signal;

said processing unit performs a settlement processing after said second communication unit receives the final purchase confirmation signal from the paying terminal;

said first communication unit transmits a settlement completion notification, which notifies completion of the settlement processing performed by said processing unit to the billing terminal; and

said second communication unit transmits to the paying terminal a receipt which notifies the receiving of said purchase amount of the settlement processed by said processing unit.

6. A settlement apparatus as claimed in claim 5, further comprising a billing terminal database storing information

about the billing terminal,

wherein said first communication unit receives from the billing terminal an identifying number to identify the billing terminal, and

said processing unit retrieves information about the billing terminal from said billing terminal database and confirms a registration of the billing terminal, based on the identifying number.

7. A settlement apparatus as claimed in claim 6, wherein said second communication unit transmits to the paying terminal the information about the billing terminal, for the paying terminal to confirm the billing terminal, retrieved from said billing terminal database.

8. A settlement apparatus as claimed in claim 7, further comprising a paying terminal database which stores information about the paying terminal,

wherein said second communication unit detects a calling telephone number of the paying terminal, and

said processing unit retrieves information about a user of the paying terminal from said paying terminal database based on the calling telephone number, and said processing unit inquires about at least one of a registration status of the user, a payment history of the user, and available amount of the user.

9. A settlement apparatus as claimed in claim 8, wherein said processing unit retrieves at least a part of attribute information of the user of the paying terminal from said paying terminal database, and said first communication unit transmits to the billing terminal at least a part of the attribute information of the user of the paying terminal.

10. A settlement apparatus as claimed in claim 11, wherein when said second communication unit receives a message which demands a purchase history of the user of the paying terminal, said processing unit retrieves said purchase history of the user from said paying terminal database, and said second communication unit transmits the purchase history to the paying terminal.

11. A settlement apparatus as claimed in claim 8,

wherein said first communication unit transmits to the billing terminal a transaction identifying number in order to identify the transaction, and

said processing unit synchronizes a communication to the billing terminal with a communication to the paying terminal, and said first communication unit transmits to the billing terminal a synchronization confirmation signal which indicates establishment of synchronization, when the billing terminal notifies said transaction identifying number to at least one of the paying terminal and a user of the paying terminal, and when the paying terminal transmits to said settlement apparatus the same transaction identifying number.

12. A settlement apparatus as claimed in claim 11, wherein said processing unit retrieves authentication information of the user of the paying terminal from said paying terminal database, and

said first communication unit, for the billing terminal to authenticate the user, transmits said authentication information of the user to the billing terminal.

13. A settlement apparatus as claimed in claim 12, wherein said authentication information of the user is a facial portrait of the user.

14. A settlement apparatus as claimed in claim 13, wherein:

said first communication unit receives a signal requesting password authentication of the user from the billing terminal;

said processing unit retrieves information about the password of the user of the paying terminal from said paying terminal database;

said second communication unit transmits an order of a password request to the paying terminal and receives a password inputted by the paying terminal from the paying terminal;

said processing unit, receiving the password from the paying terminal, inquires about the information about the password retrieved from said paying terminal database; and

said first communication unit authenticates the user by transmitting a password inquiry result performed by said processing unit to the billing terminal.

15. A settlement apparatus as claimed in claim 11, wherein:

said processing unit retrieves authentication information registered by the user of the paying terminal from said paying terminal database;

said second communication unit transmits an order to inquire about said authentication information to the paying terminal and receives an answer of the paying terminal inputting corresponding to the order from the paying terminal; and

said processing unit authenticates the user by verifying the answer received from the paying terminal against said authentication information retrieved from said paying terminal database.

16. A settlement apparatus as claimed in claim 15, wherein:

said authentication information registered by the user

of the paying terminal, which said processing unit retrieves from said paying terminal database, is at least one of a password of the user, a voice data spoken from the user, a face image data of the user, an image data of an iris or retina of the user, and an image data of finger print of the user, and

said answer of said processing unit receiving from the paying terminal in order to inquire with said authentication information is at least one of character data, voice data, and image data.

17. A settlement apparatus as claimed in claim 8, further comprising a billing terminal database which stores information about the billing terminal, wherein:

said processing unit retrieves information about the billing terminal from said billing terminal database so that the billing terminal confirms the paying terminal,

said second communication unit transmits to the paying terminal the information about the billing terminal in addition to said transaction identifying number for identifying the transaction, and

when the paying terminal confirms the information about the billing terminal and transmits said transaction identifying number to said settlement apparatus, said processing unit synchronizes the communication to the billing terminal with the communication to the paying terminal, and said first communication unit transmits a synchronization confirmation signal which indicates establishment of synchronization with the billing terminal.

18. A settlement apparatus as claimed in claim 17, wherein said first communication unit receives from the billing terminal an item ordering information which is for a user of the paying terminal to input an order of an item,

said second communication unit transmits the item ordering information to the paying terminal, and

when the paying terminal transmits to said settlement apparatus an order of an item, inputted by the user of the paying terminal based on the item ordering information, said first communication unit transmits the order of an item to the billing terminal.

19. A settlement apparatus as claimed in claim 18, further comprising a voice database which stores user voice data of the paying terminal, wherein:

said second communication unit transmits a message prompting the paying terminal to input a user voice and receives the user voice from the paying terminal, and

said processing unit, by inquiring about the voice of the user using said voice database, authenticates the user.

20. A settlement apparatus as claimed in claim 19, wherein said settlement apparatus authenticates the user, by said processing unit retrieving authentication information registered by the user of the paying terminal from said paying terminal database,

said second communication unit transmits an instruction which inquires said authentication information to the paying terminal, and the paying terminal receives an answer inputted corresponding to the instruction from the paying terminal, and

said processing unit inquires the answer received from the paying terminal to said authentication information retrieved from said paying terminal database.

21. A settlement apparatus as claimed in claim 20, wherein said authentication information, said processing unit retrieving from said paying terminal database and registered

by the user of the paying terminal is at least one of a password of the user, voice data spoken by the user, facial portrait image data of the user, at least one of iris and retina data of the user, and finger print image data of the user; and the answer of said processing unit receiving from the paying terminal in order to inquire with said authentication information is at least one of character data, voice data, and image data.

22. A billing terminal performing billing of a transaction against a paying terminal paying for the transaction, by communicating with a settlement apparatus settling the transaction, comprising:

a communication unit which connects to the settlement apparatus via a communication network, said communication unit transmitting an identification number to identify the billing terminal to the settlement apparatus and receiving from the settlement apparatus a synchronization confirmation signal indicating establishment of synchronization with the paying terminal; and

a processing unit which performs billing of the transaction.

23. A billing terminal as claimed in claim 22, wherein said communication unit connects to the settlement apparatus via at least one of a commercial telephone line, a private line, and radiotelephone communication.

24. A billing terminal as claimed in claim 23, wherein said communication unit receives from the settlement apparatus at least a part of attribute information of the user of the paying terminal.

25. A billing terminal as claimed in claim 23, further

comprising a display unit displaying a status of the transaction performed by said processing unit;

wherein said communication unit receives a transaction identifying number to identify the transaction from the settlement apparatus,

said display unit, by indicating said transaction identifying number, notifies said transaction identifying number to at least one of the paying terminal and a user of the paying terminal, and

when said communication unit receives from the settlement apparatus a synchronization confirmation signal indicating the establishment of synchronization with the paying terminal, said display unit indicates that said communication unit receives the synchronization confirmation signal.

26. A billing apparatus as claimed in claim 25, further comprising a short range communication unit, said short range communication unit transmitting said transaction identifying number to the paying terminal by communicating with the paying terminal via at least one of an optical communication and a wireless communication.

27. A billing terminal as claimed in claim 25, wherein said communication unit transmits to the settlement apparatus a purchase amount of the transaction and receives from the settlement apparatus a settlement completion notification to notify a completion of the settlement processing.

28. A billing terminal as claimed in claim 27, wherein said communication unit receives from the settlement apparatus authentication information of the user of the paying terminal, and

said processing unit authenticates the user based on

said authentication information received from the settlement apparatus.

29. A billing terminal as claimed in claim 28, wherein said authentication information of the user is a facial portrait of the user.

30. A billing terminal as claimed in claim 29, wherein said communication unit transmits to the settlement apparatus a signal to demand password authentication of the user, and receives from the settlement apparatus a result of the password authentication of the user when said processing unit is not able to authenticate the user using the facial portrait of the user.

31. A billing terminal as claimed in claim 27, further comprising:

an item choice unit by which the user of the paying terminal is prompted to choose a purchasing item, said item choice unit prompting the user to choose an item when said communication unit receives from the settlement apparatus said synchronization confirmation signal indicating the establishment of synchronization with the paying terminal; and

an item sending unit through which a purchased item to be sent out,

wherein said communication unit transmits to the settlement apparatus a price of the item chosen by the user as said purchase amount of the transaction, and when said communication unit receives the settlement completion notification from the settlement apparatus, said item sending unit sends out the item chosen by the user based on the settlement completion notification.

32. A billing terminal as claimed in claim 23, said communication unit transmits to the settlement apparatus order information to prompt the user of the paying terminal to input an order of purchasing an item and receives from the settlement apparatus an order inputted by the user of the paying terminal based on the order information,

said communication unit transmits to the settlement apparatus said purchase amount calculated by said communication unit and receives from the settlement apparatus a settlement completion notification to notify a completion of the settlement processing.

33. A billing terminal for performing billing of a transaction, communicating with a settlement apparatus performing settlement of the transaction against a paying terminal performing a payment of the transaction, and communicating with a computer terminal indicating a status of the transaction to provide information about the transaction, the billing terminal comprising:

a first communication unit connecting to the settlement apparatus via a communication network, said first communication unit transmitting an identifying number identifying said billing terminal to the settlement apparatus and receiving a transaction identifying number identifying the transaction from the settlement apparatus, and said first communication unit receiving from the settlement apparatus a synchronization confirmation signal indicating the establishment of synchronization with the paying terminal;

a second communication unit connecting to the computer terminal via the communication network, said second communication unit transmitting to the computer terminal for a user of the paying terminal said transaction identifying number in order to notify said transaction identifying number; and

a processing unit performing billing of the transaction.

34. A billing terminal as claimed in claim 33, wherein said second communication unit receives from the computer terminal a purchase amount of the transaction, and

when said first communication unit transmits said purchase amount to the settlement apparatus and receives from the settlement apparatus a settlement completion notification which notifies a completion of the settlement processing.

35. A billing terminal as claimed in claim 34, wherein said second communication unit, for the computer terminal to indicate a state of the transaction, transmits to the computer terminal at least one of the synchronization confirmation signal and the settlement completion notification for said first communication unit receiving from the settlement apparatus.

36. An authentication apparatus for communicating with a first terminal and with a second terminal demanding to authenticate a user of the first terminal, and performing the authentication demanded by the second terminal, the apparatus comprising:

a user database storing authentication information registered by a user of the first terminal;

a first communication unit connecting to the first terminal via a first communication network, said first communication unit transmits to the first terminal an order to inquire said authentication information and receives from the first terminal an answer inputted by the first terminal corresponding to the order;

a second communication unit connecting to the second terminal via a second communication network, said second

communication unit receives from the second terminal an authentication demand to authenticate the user of the first terminal; and

a processing unit performing the authentication, said processing unit sets up an identifying number to identify the authentication demanded by the second terminal, and when the first terminal transmits the same identifying number as said identifying number to said authentication apparatus, synchronizes a communication to the first terminal with a communication to the second terminal, retrieves from said user database authentication information to authenticate the user of the first terminal, and by inquiring the answer received from the first terminal with said authentication information retrieved from said user database, authenticates the user of the first terminal; wherein

said second communication unit, by transmitting to the second terminal an authentication result judged by said processing unit, authenticates the user of the first terminal.

37. An authentication apparatus as claimed in claim 36, wherein said authentication information, said processing unit retrieving from said user database, registered by the user of the first terminal is at least one of a password of the user, voice data spoken by the user, facial portrait image data of the user, at least one of iris and retina data of the user, and finger print image data of the user; and the answer of said processing unit receiving from the first terminal in order to inquire with said authentication information is at least one of character data, voice data, and image data.

38. A recording medium which stores a program for a computer, communicating with a billing terminal performing billing of a transaction and with a paying terminal

performing payment of the transaction, and performing a settlement of transaction, said program comprising:

a first communication module which operates the computer to communicate to the billing terminal via a commercial telephone line or a private line;

a second communication module which operates the computer to communicate to the paying terminal via a radiotelephone communication; and

a processing module which performs the settlement of transaction, said processing module setting a transaction identifying number which identifies the transaction and said processing module synchronizing a communication to the billing terminal with a communication to the paying terminal when the paying terminal transmits a transaction identifying number the same transaction identifying number to the settlement apparatus.

ABSTRACT OF THE DISCLOSURE

An electronic settlement system for settling a transaction through a communication network comprises a settlement apparatus which performs the settlement of the transaction; a billing terminal connecting to the settlement apparatus via the communication network; and a paying terminal, connecting to the settlement apparatus via the communication network, wherein the settlement apparatus performs the settlement of a transaction by synchronizing a communication to the billing terminal with a communication to the paying terminal when the settlement apparatus sets up a transaction identifying number which identifies the transaction and when the paying terminal transmits the same transaction identifying number to the settlement apparatus.

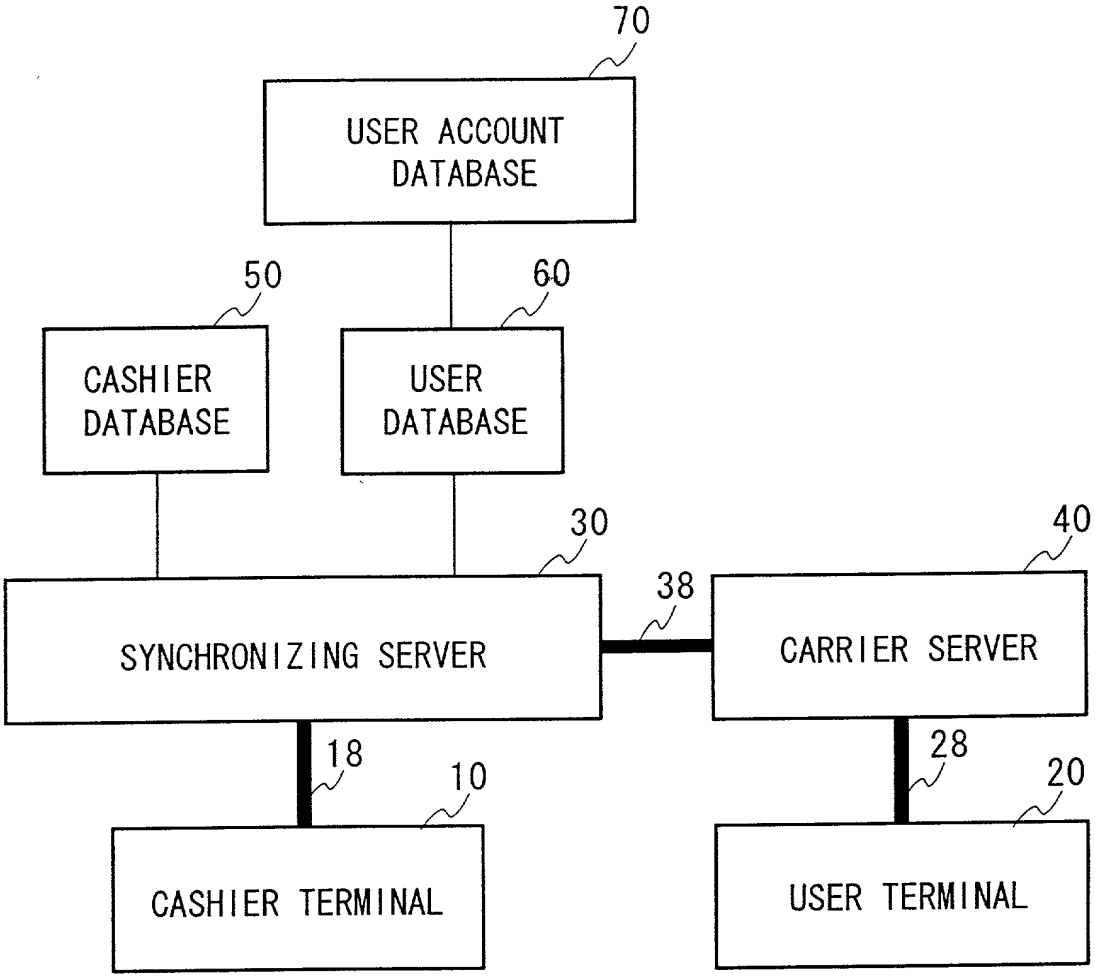

70
USER ACCOUNT DATABASE
50
60
CASHIER DATABASE
USER DATABASE
30
40
38
SYNCHRONIZING SERVER
CARRIER SERVER
18
10
28
20
CASHIER TERMINAL
USER TERMINAL

FIG. 1

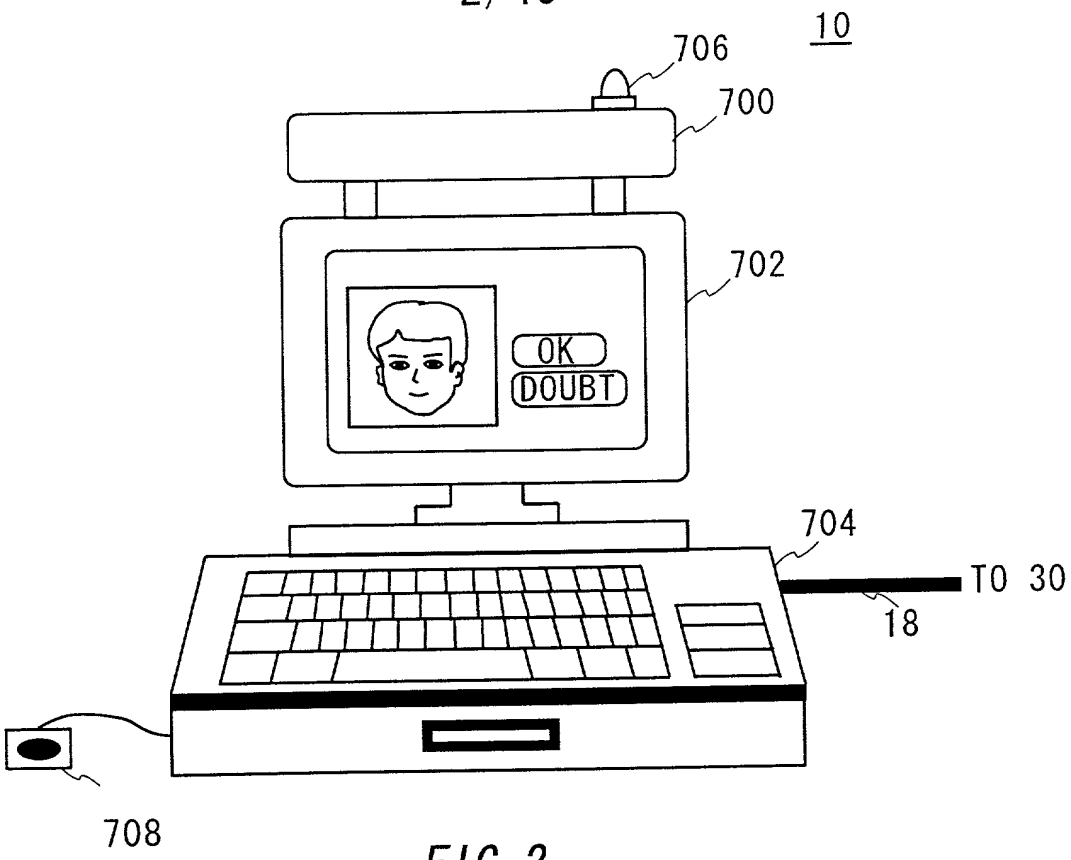

10
706
700
702
OK
DOUBT
704
TO 30
18
708

FIG. 2

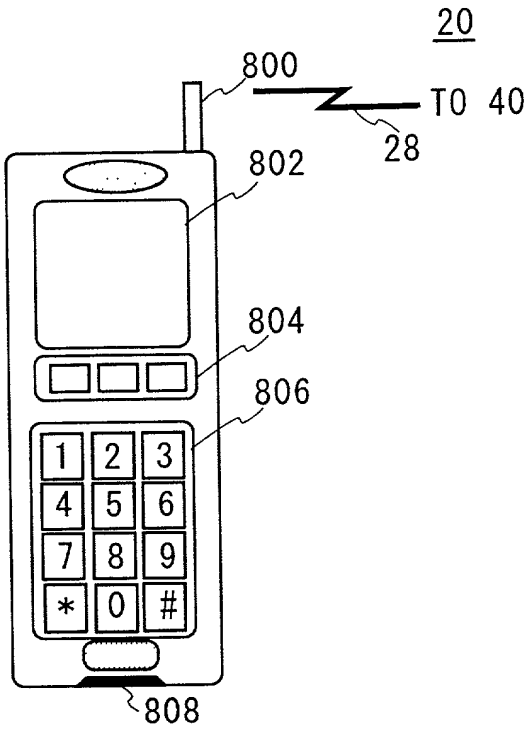

20
800
TO 40
28
802
804
806
1
2
3
4
5
6
7
8
9
*
0
#
808

FIG. 3

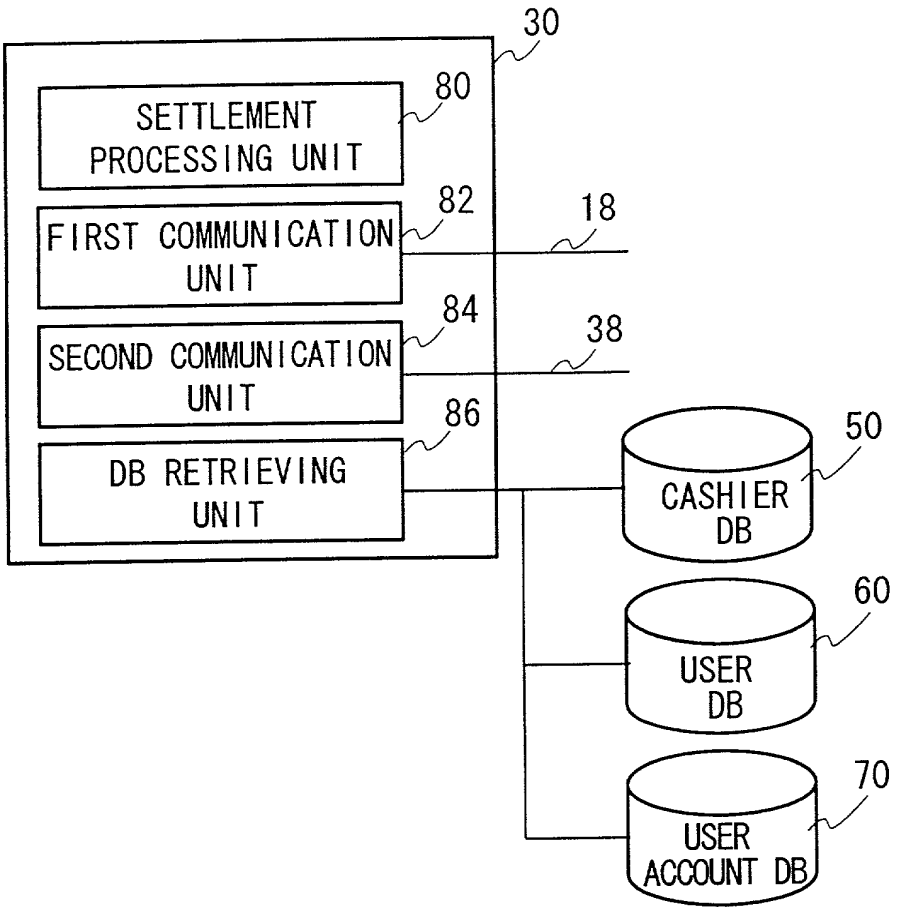

30
SETTLEMENT PROCESSING UNIT
80
FIRST COMMUNICATION UNIT
82
18
SECOND COMMUNICATION UNIT
84
38
DB RETRIEVING UNIT
86
CASHIER DB
50
USER DB
60
USER ACCOUNT DB
70

FIG. 4

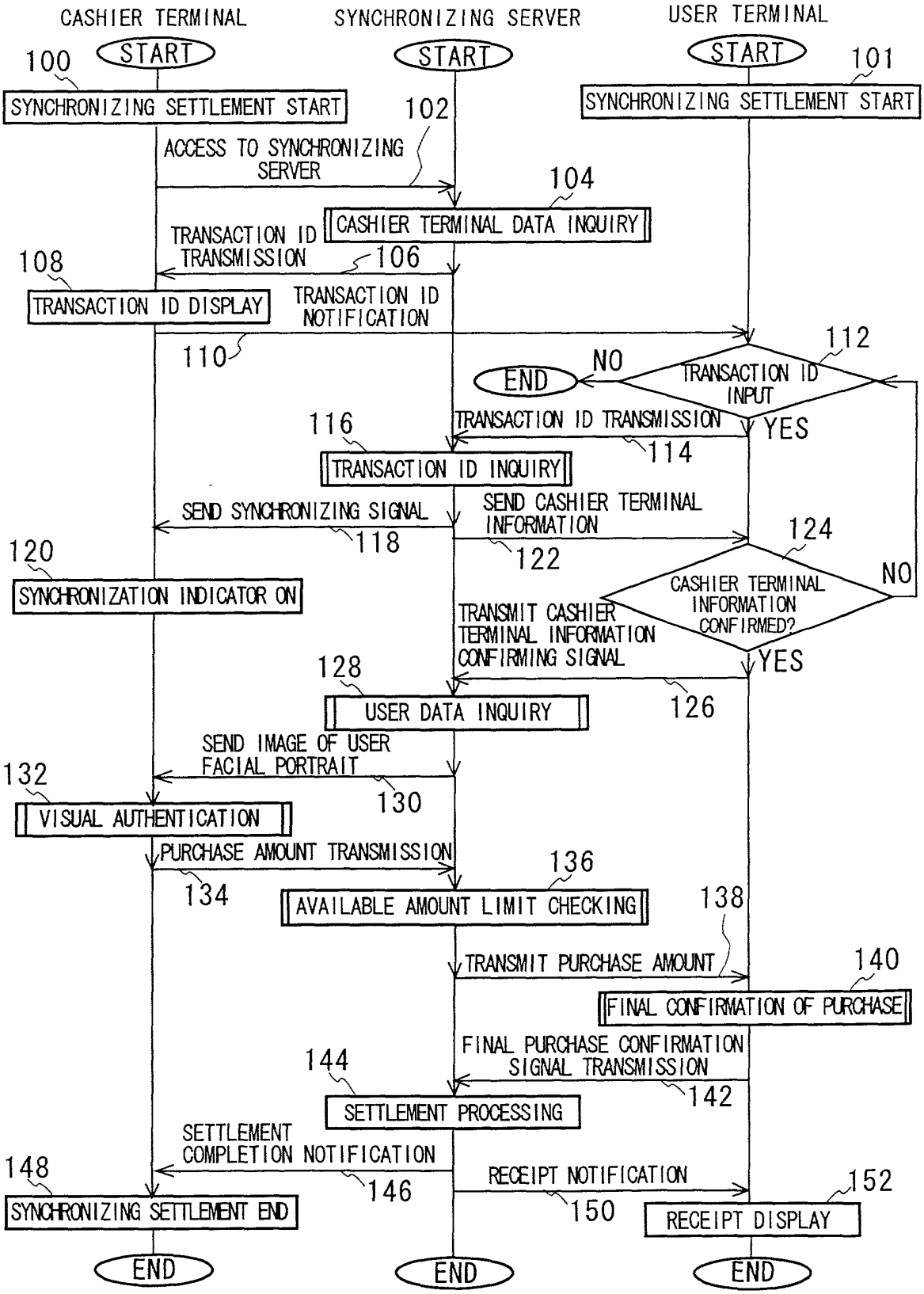

CASHIER TERMINAL
SYNCHRONIZING SERVER
USER TERMINAL
START
START
START
100
SYNCHRONIZING SETTLEMENT START
101
SYNCHRONIZING SETTLEMENT START
102
ACCESS TO SYNCHRONIZING SERVER
104
CASHIER TERMINAL DATA INQUIRY
TRANSACTION ID TRANSMISSION
106
108
TRANSACTION ID DISPLAY
TRANSACTION ID NOTIFICATION
110
112
NO
END
TRANSACTION ID INPUT
YES
116
TRANSACTION ID TRANSMISSION
114
TRANSACTION ID INQUIRY
SEND SYNCHRONIZING SIGNAL
118
SEND CASHIER TERMINAL INFORMATION
122
124
120
SYNCHRONIZATION INDICATOR ON
CASHIER TERMINAL INFORMATION CONFIRMED?
NO
TRANSMIT CASHIER TERMINAL INFORMATION CONFIRMING SIGNAL
YES
126
128
USER DATA INQUIRY
SEND IMAGE OF USER FACIAL PORTRAIT
130
132
VISUAL AUTHENTICATION
PURCHASE AMOUNT TRANSMISSION
134
136
AVAILABLE AMOUNT LIMIT CHECKING
138
TRANSMIT PURCHASE AMOUNT
140
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
142
144
SETTLEMENT PROCESSING
SETTLEMENT COMPLETION NOTIFICATION
146
148
RECEIPT NOTIFICATION
150
152
SYNCHRONIZING SETTLEMENT END
RECEIPT DISPLAY
END
END
END

FIG. 5

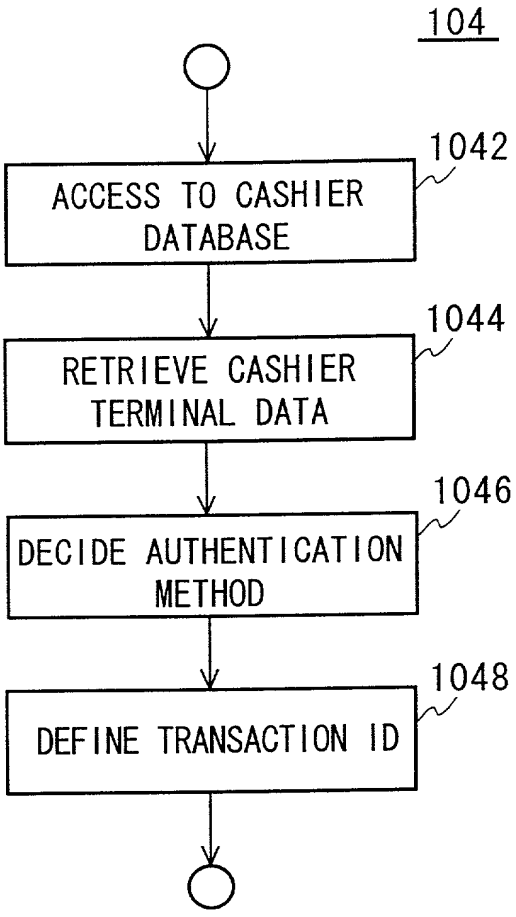

104
1042
ACCESS TO CASHIER DATABASE
1044
RETRIEVE CASHIER TERMINAL DATA
1046
DECIDE AUTHENTICATION METHOD
1048
DEFINE TRANSACTION ID

FIG. 6

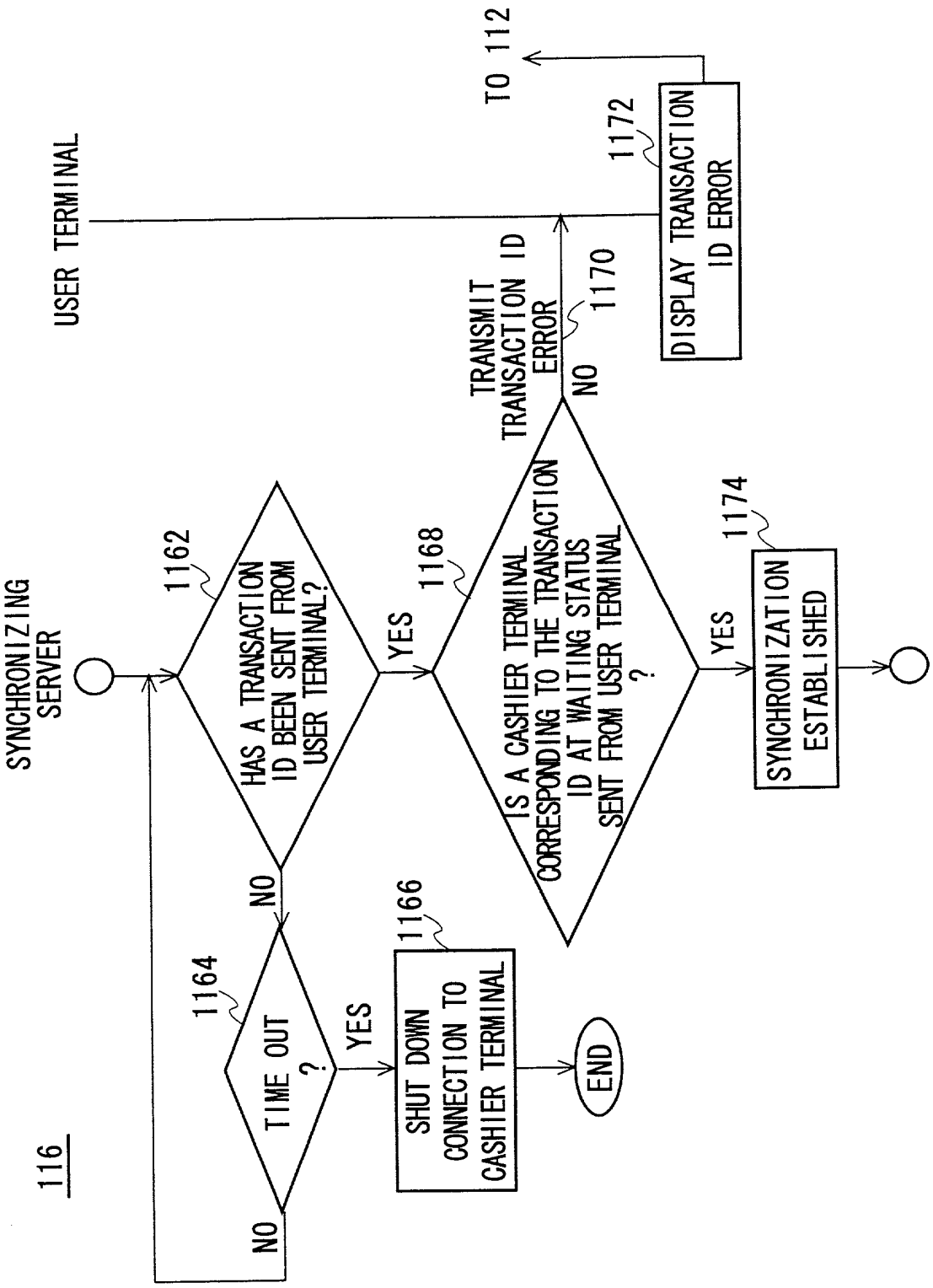

116
SYNCHRONIZING SERVER
USER TERMINAL
1162
HAS A TRANSACTION ID BEEN SENT FROM USER TERMINAL?
YES
1168
IS A CASHIER TERMINAL CORRESPONDING TO THE TRANSACTION ID AT WAITING STATUS SENT FROM USER TERMINAL ?
YES
1174
SYNCHRONIZATION ESTABLISHED
NO
TRANSMIT TRANSACTION ID ERROR
1170
NO
1164
TIME OUT ?
YES
1166
SHUT DOWN CONNECTION TO CASHIER TERMINAL
END
NO
1172
DISPLAY TRANSACTION ID ERROR
TO 112

FIG. 7

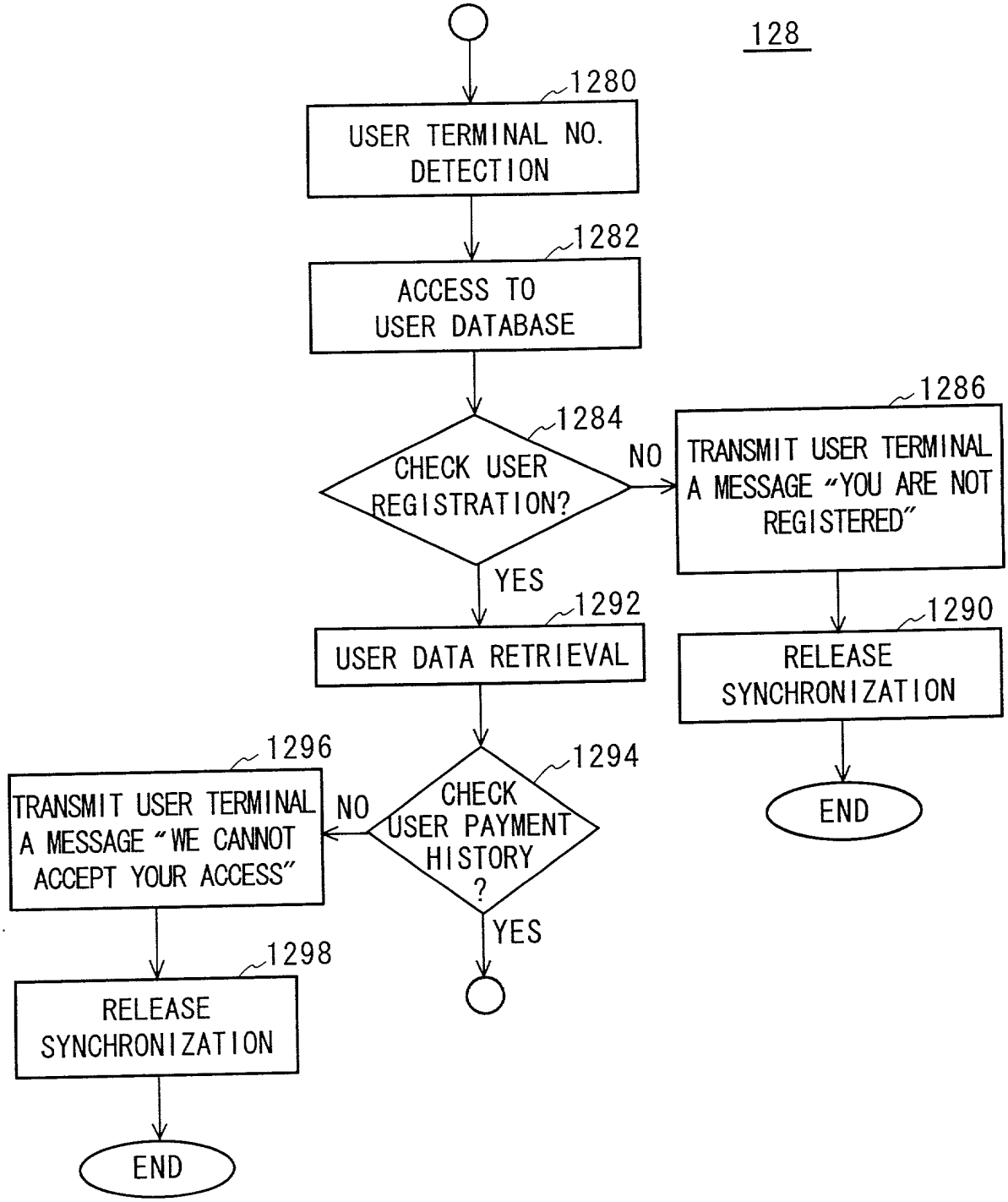

128
1280
USER TERMINAL NO. DETECTION
1282
ACCESS TO USER DATABASE
1284
CHECK USER REGISTRATION?
NO
1286
TRANSMIT USER TERMINAL A MESSAGE "YOU ARE NOT REGISTERED"
YES
1292
USER DATA RETRIEVAL
1290
RELEASE SYNCHRONIZATION
END
1296
TRANSMIT USER TERMINAL A MESSAGE "WE CANNOT ACCEPT YOUR ACCESS"
NO
1294
CHECK USER PAYMENT HISTORY ?
YES
1298
RELEASE SYNCHRONIZATION
END

FIG. 8

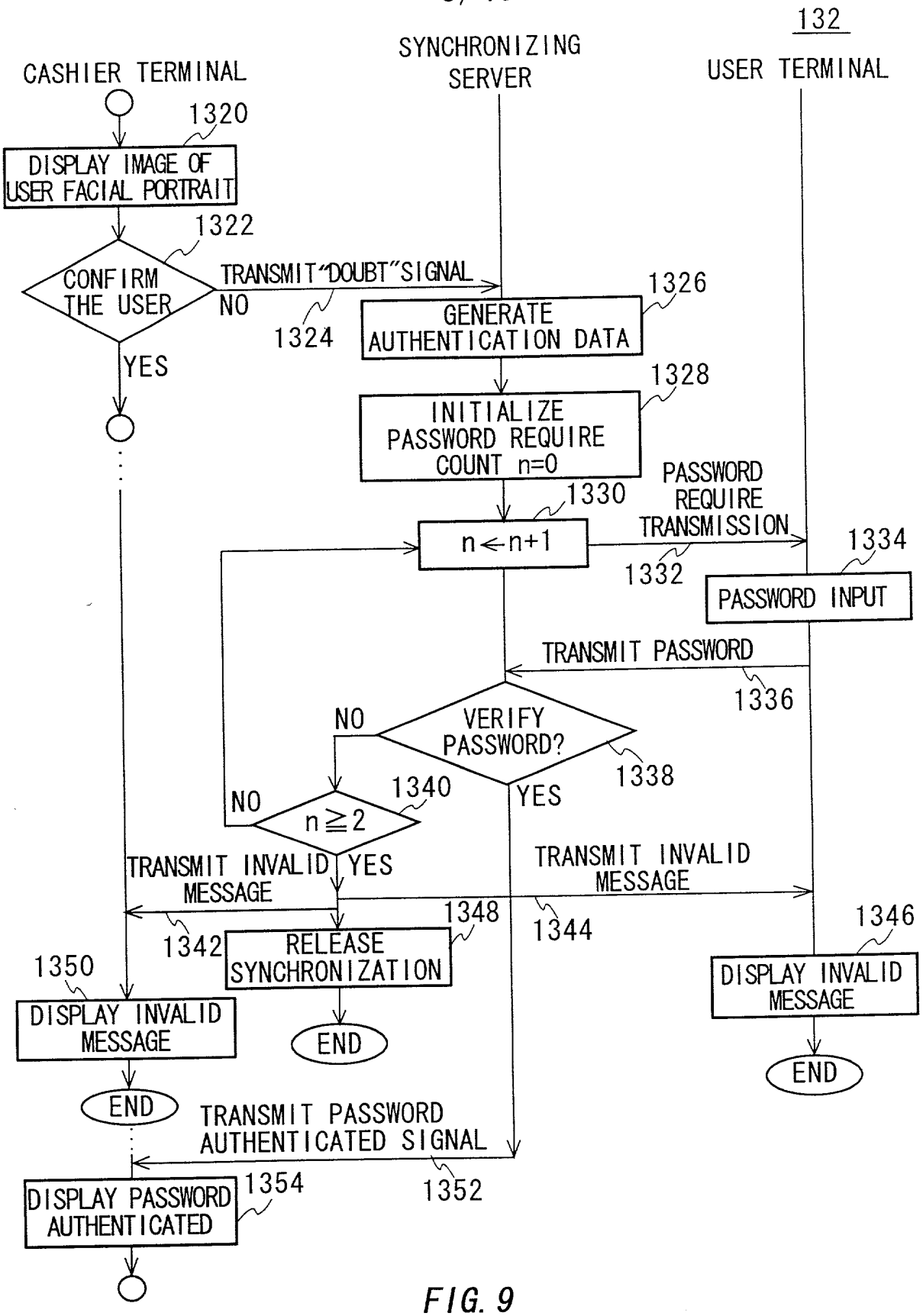

CASHIER TERMINAL
SYNCHRONIZING SERVER
132
USER TERMINAL
1320
DISPLAY IMAGE OF USER FACIAL PORTRAIT
1322
CONFIRM THE USER
NO
TRANSMIT "DOUBT" SIGNAL
1324
1326
GENERATE AUTHENTICATION DATA
YES
1328
INITIALIZE PASSWORD REQUIRE COUNT n=0
1330
n←n+1
PASSWORD REQUIRE TRANSMISSION
1332
1334
PASSWORD INPUT
TRANSMIT PASSWORD
1336
NO
VERIFY PASSWORD?
1338
YES
NO
1340
n≧2
TRANSMIT INVALID MESSAGE
YES
TRANSMIT INVALID MESSAGE
1342
1344
1348
RELEASE SYNCHRONIZATION
1346
1350
DISPLAY INVALID MESSAGE
END
DISPLAY INVALID MESSAGE
END
END
TRANSMIT PASSWORD AUTHENTICATED SIGNAL
1352
1354
DISPLAY PASSWORD AUTHENTICATED

FIG. 9

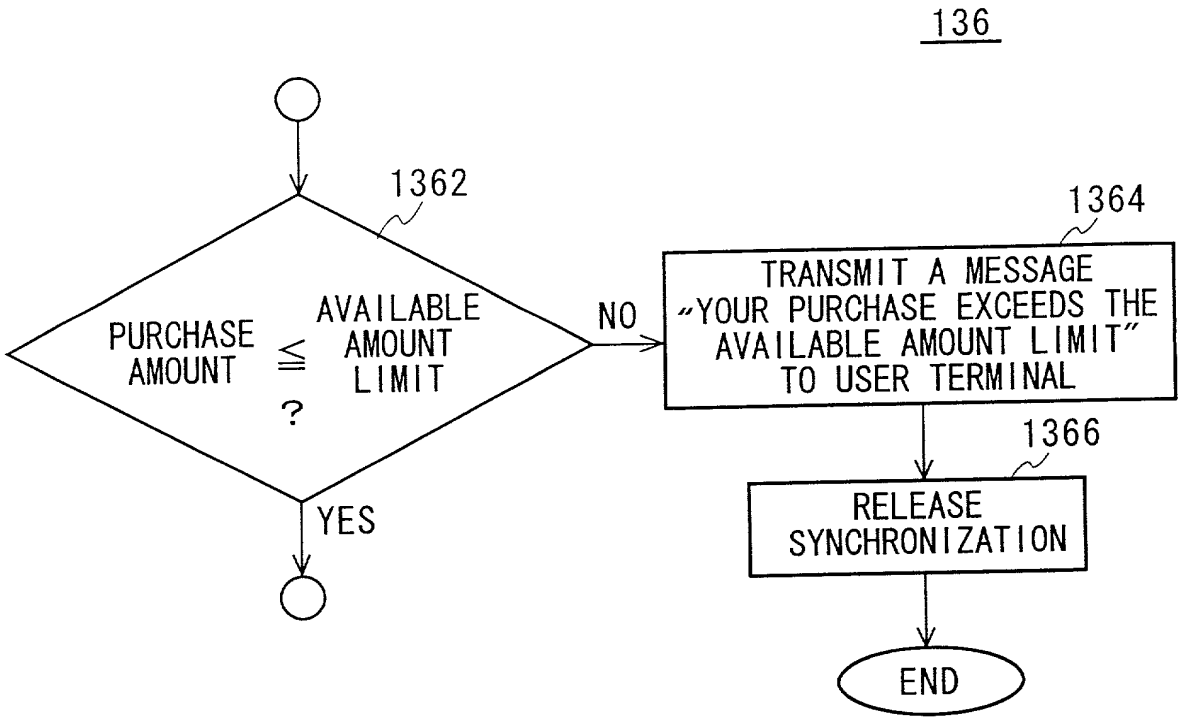

136
1362
PURCHASE AMOUNT ≦ AVAILABLE AMOUNT LIMIT ?
NO
YES
1364
TRANSMIT A MESSAGE "YOUR PURCHASE EXCEEDS THE AVAILABLE AMOUNT LIMIT" TO USER TERMINAL
1366
RELEASE SYNCHRONIZATION
END

FIG. 10

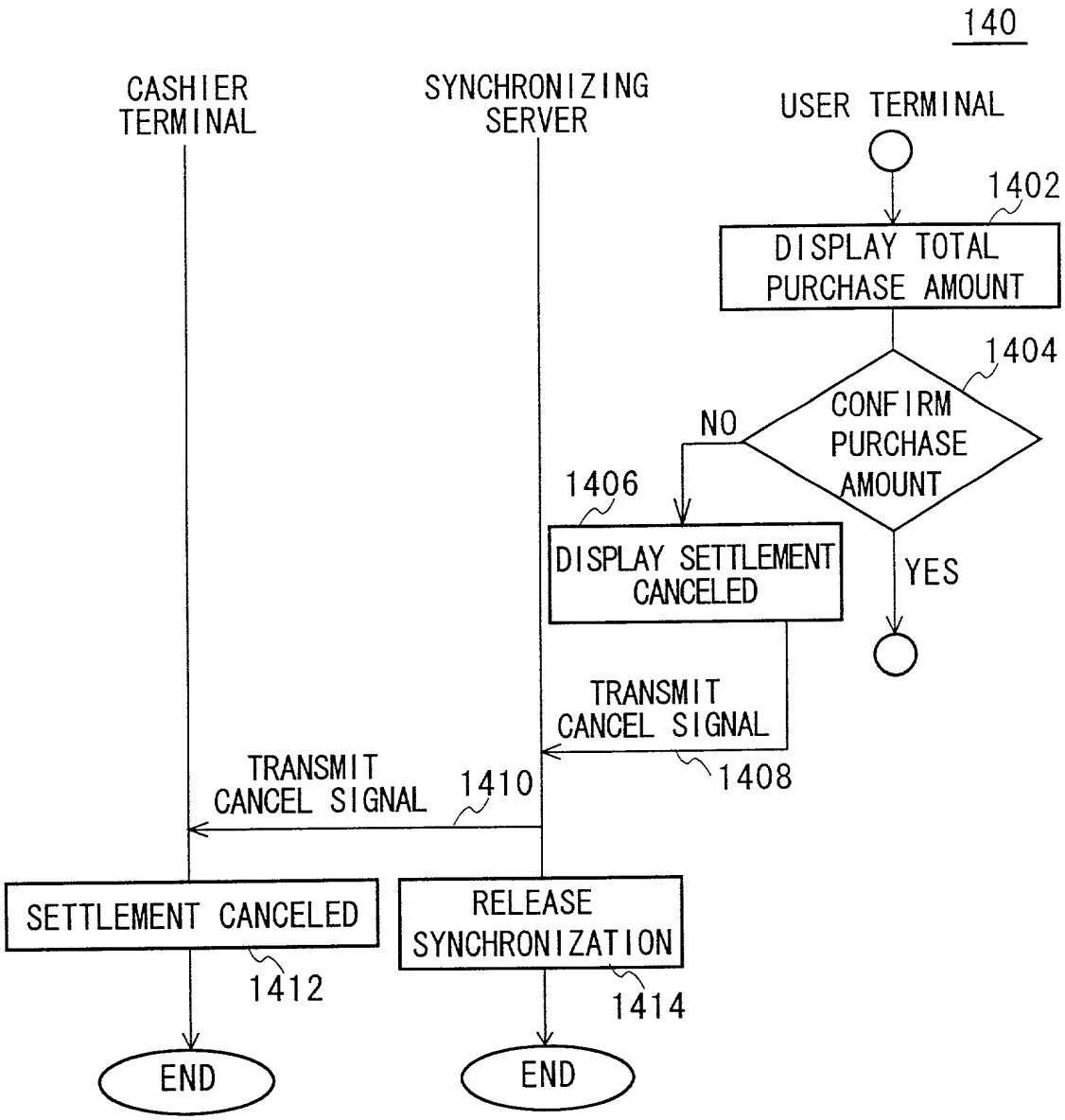

140
CASHIER TERMINAL
SYNCHRONIZING SERVER
USER TERMINAL
1402
DISPLAY TOTAL PURCHASE AMOUNT
1404
CONFIRM PURCHASE AMOUNT
NO
YES
1406
DISPLAY SETTLEMENT CANCELED
TRANSMIT CANCEL SIGNAL
1408
TRANSMIT CANCEL SIGNAL
1410
SETTLEMENT CANCELED
1412
RELEASE SYNCHRONIZATION
1414
END
END

FIG. 11

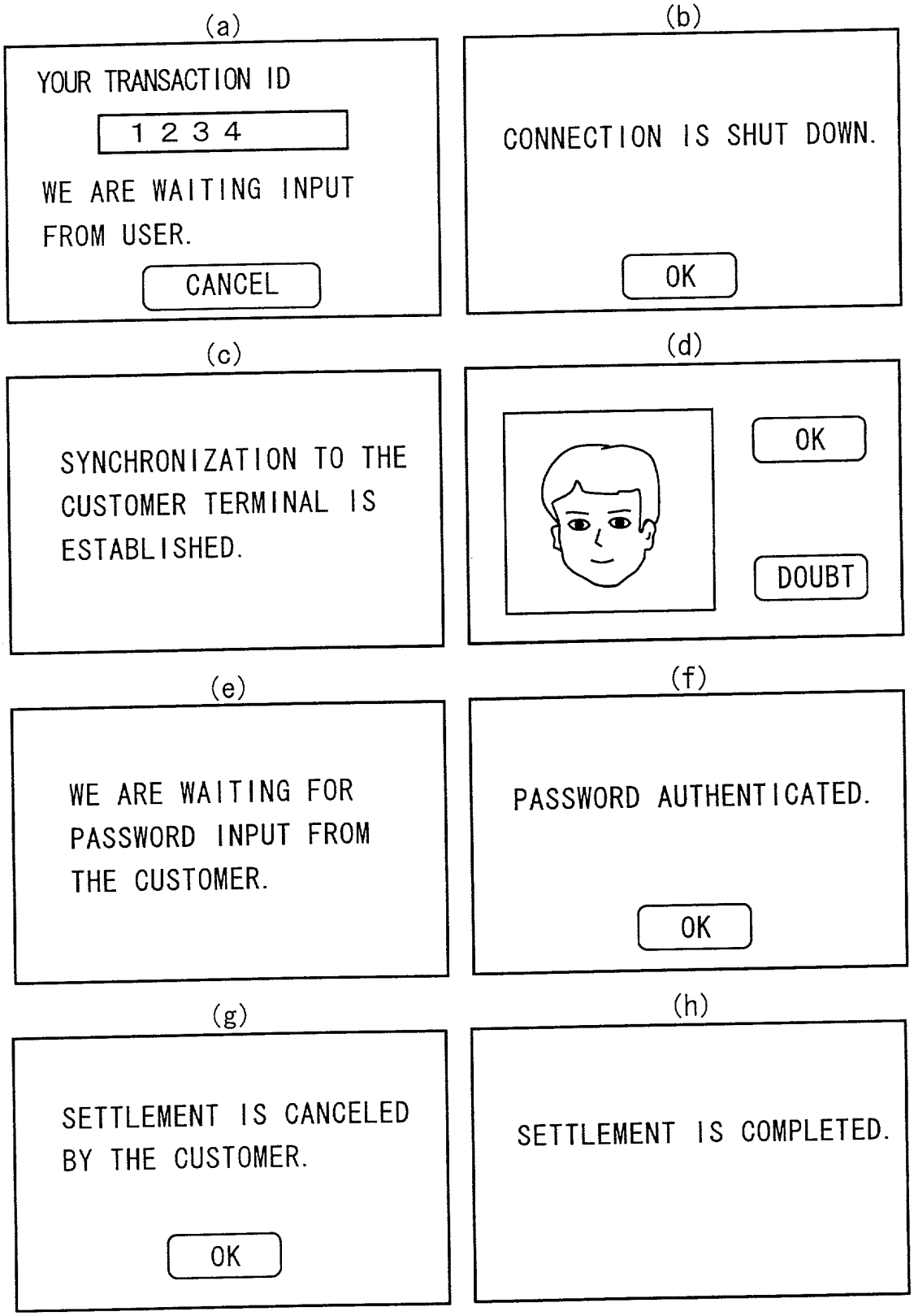

(a)
YOUR TRANSACTION ID
1 2 3 4
WE ARE WAITING INPUT FROM USER.
CANCEL
(b)
CONNECTION IS SHUT DOWN.
OK
(c)
SYNCHRONIZATION TO THE CUSTOMER TERMINAL IS ESTABLISHED.
(d)
OK
DOUBT
(e)
WE ARE WAITING FOR PASSWORD INPUT FROM THE CUSTOMER.
(f)
PASSWORD AUTHENTICATED.
OK
(g)
SETTLEMENT IS CANCELED BY THE CUSTOMER.
OK
(h)
SETTLEMENT IS COMPLETED.

FIG. 12

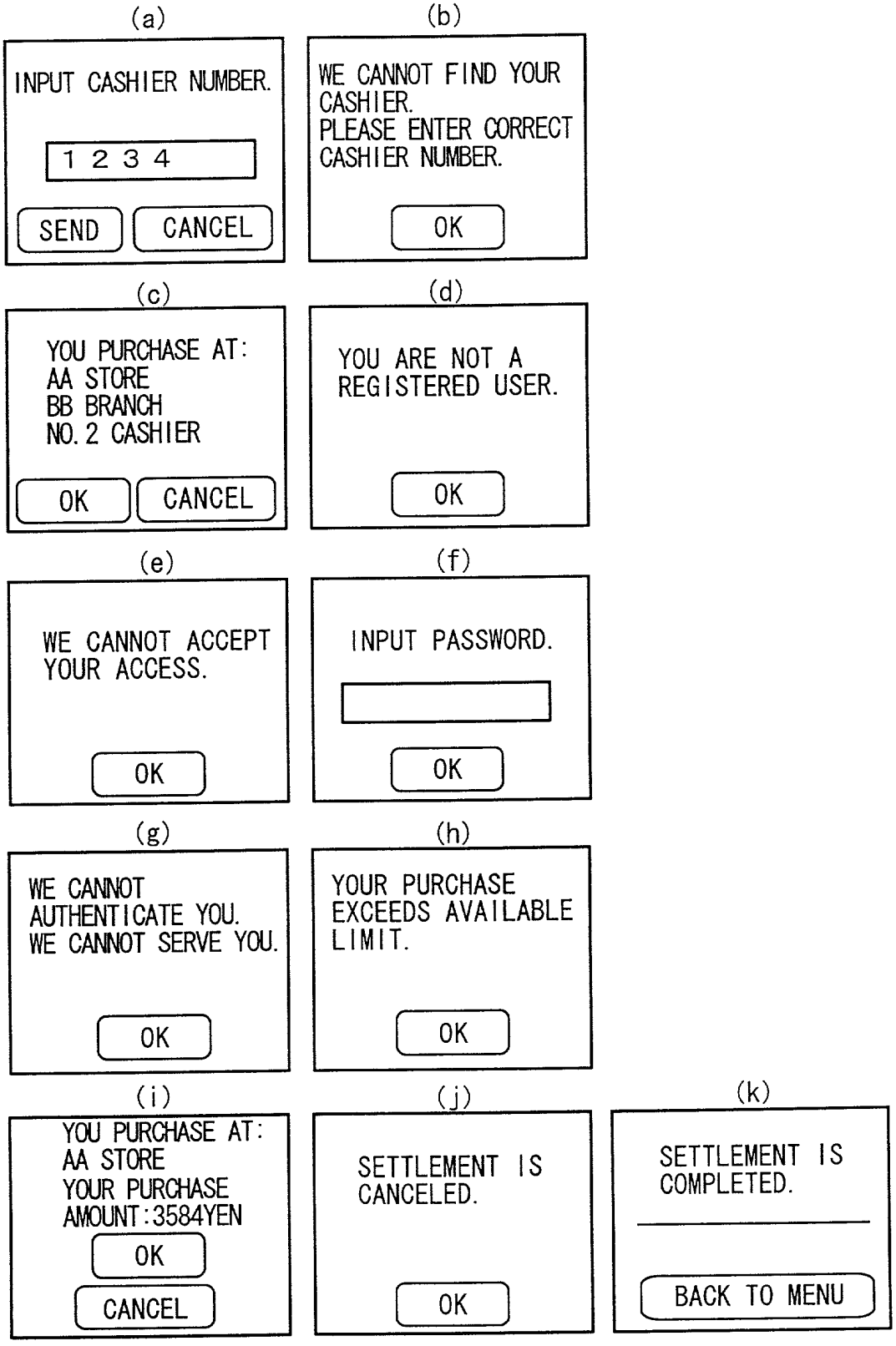

(a)
INPUT CASHIER NUMBER.
1 2 3 4
SEND
CANCEL
(b)
WE CANNOT FIND YOUR CASHIER.
PLEASE ENTER CORRECT CASHIER NUMBER.
OK
(c)
YOU PURCHASE AT:
AA STORE
BB BRANCH
NO. 2 CASHIER
OK
CANCEL
(d)
YOU ARE NOT A REGISTERED USER.
OK
(e)
WE CANNOT ACCEPT YOUR ACCESS.
OK
(f)
INPUT PASSWORD.
OK
(g)
WE CANNOT AUTHENTICATE YOU.
WE CANNOT SERVE YOU.
OK
(h)
YOUR PURCHASE EXCEEDS AVAILABLE LIMIT.
OK
(i)
YOU PURCHASE AT:
AA STORE
YOUR PURCHASE AMOUNT:3584YEN
OK
CANCEL
(j)
SETTLEMENT IS CANCELED.
OK
(k)
SETTLEMENT IS COMPLETED.
BACK TO MENU

FIG. 13

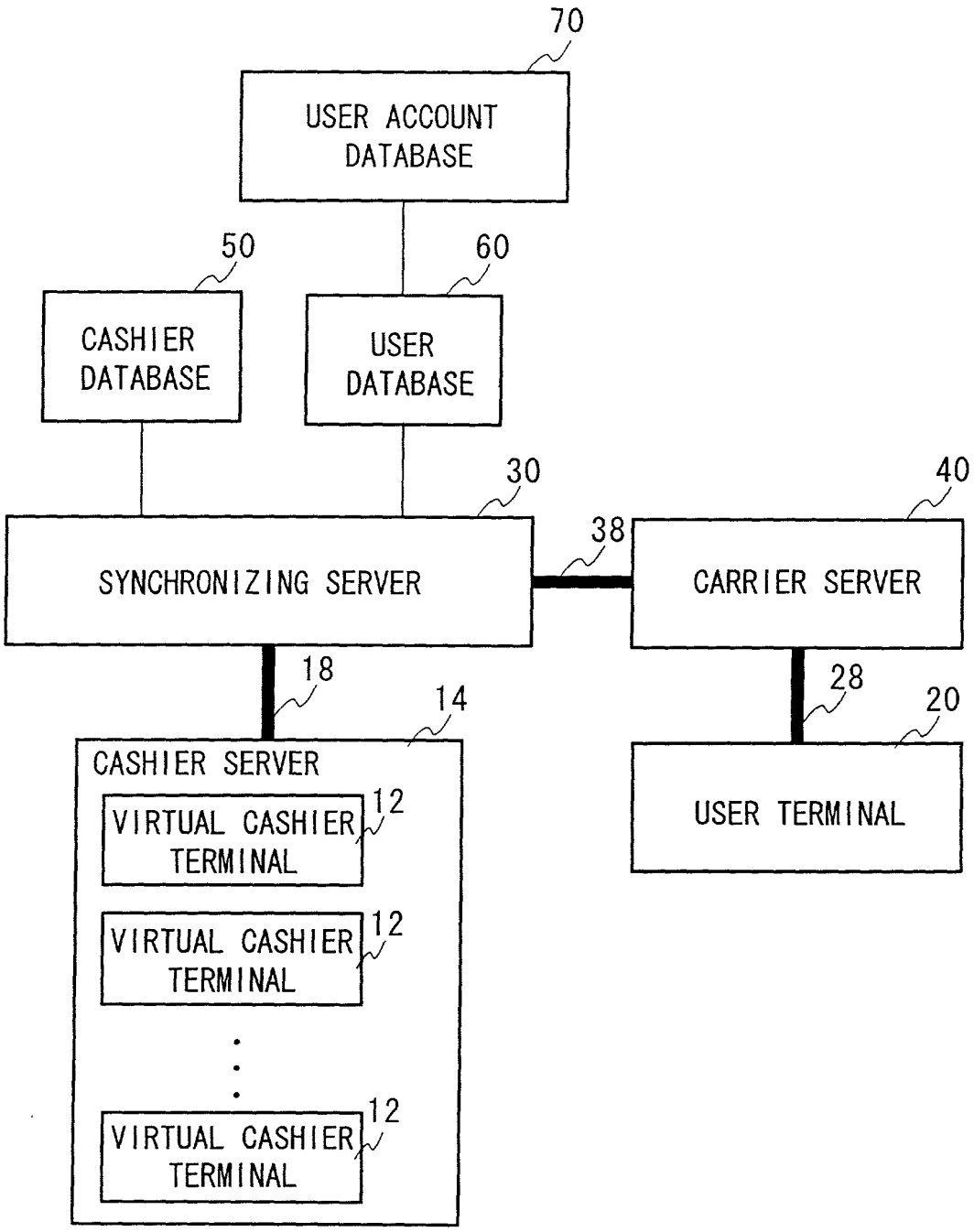
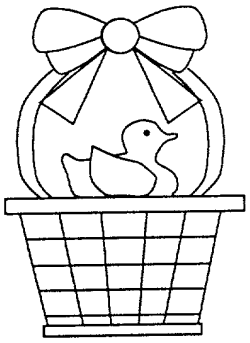
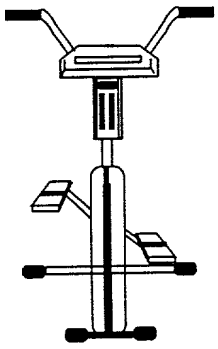

70
USER ACCOUNT DATABASE
50
60
CASHIER DATABASE
USER DATABASE
30
40
38
SYNCHRONIZING SERVER
CARRIER SERVER
18
14
28
20
CASHIER SERVER
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
12
USER TERMINAL

FIG. 14

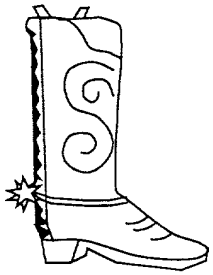
OOMAIL ORDER JULY 2000 TRANSACTION ID : 997611



ITEM : BIBELOT OF BIRD
PRICE : ¥1, 980
ITEM NUMBER
BLUE : 54321
RED : 54322
YELLOW : 54323



ITEM : EXERCISE BICYCLE
PRICE : ¥56, 000
ITEM NUMBER
BLUE : 54331
RED : 54332
YELLOW : 54333



ITEM : BOOTS
PRICE : ¥32, 000
ITEM NUMBER : 6123+
23cm=23
24cm=24
25cm=26
27cm=27

FIG. 15

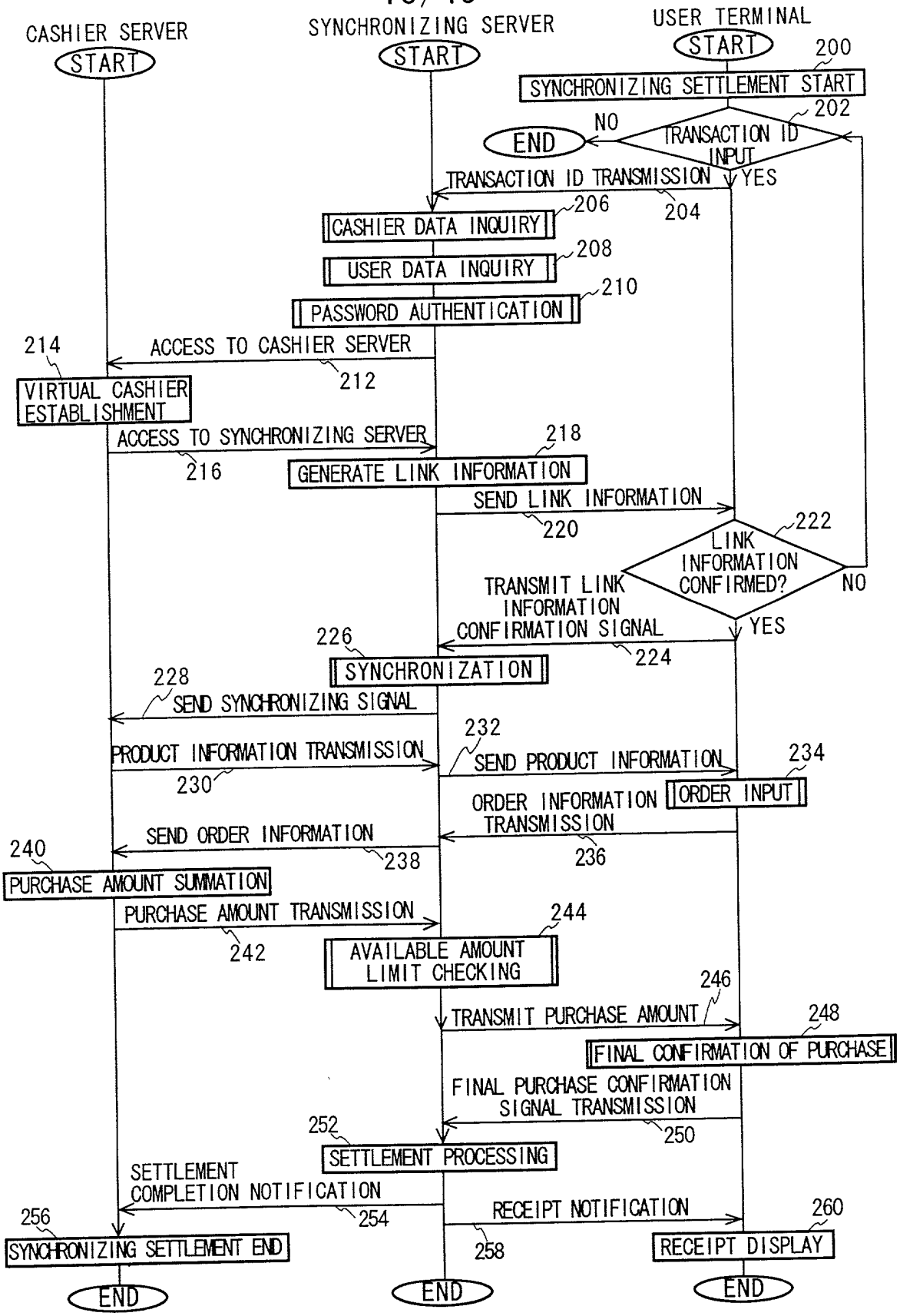

CASHIER SERVER
SYNCHRONIZING SERVER
USER TERMINAL
START
START
START
200
SYNCHRONIZING SETTLEMENT START
202
TRANSACTION ID INPUT
NO
END
YES
TRANSACTION ID TRANSMISSION
204
206
CASHIER DATA INQUIRY
208
USER DATA INQUIRY
210
PASSWORD AUTHENTICATION
214
ACCESS TO CASHIER SERVER
212
VIRTUAL CASHIER ESTABLISHMENT
ACCESS TO SYNCHRONIZING SERVER
216
218
GENERATE LINK INFORMATION
SEND LINK INFORMATION
220
222
LINK INFORMATION CONFIRMED?
NO
YES
TRANSMIT LINK INFORMATION CONFIRMATION SIGNAL
224
226
SYNCHRONIZATION
228
SEND SYNCHRONIZING SIGNAL
232
PRODUCT INFORMATION TRANSMISSION
230
SEND PRODUCT INFORMATION
234
ORDER INPUT
ORDER INFORMATION TRANSMISSION
236
SEND ORDER INFORMATION
238
240
PURCHASE AMOUNT SUMMATION
PURCHASE AMOUNT TRANSMISSION
242
244
AVAILABLE AMOUNT LIMIT CHECKING
246
TRANSMIT PURCHASE AMOUNT
248
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
250
252
SETTLEMENT PROCESSING
SETTLEMENT COMPLETION NOTIFICATION
254
RECEIPT NOTIFICATION
260
256
SYNCHRONIZING SETTLEMENT END
258
RECEIPT DISPLAY
END
END
END

FIG. 16

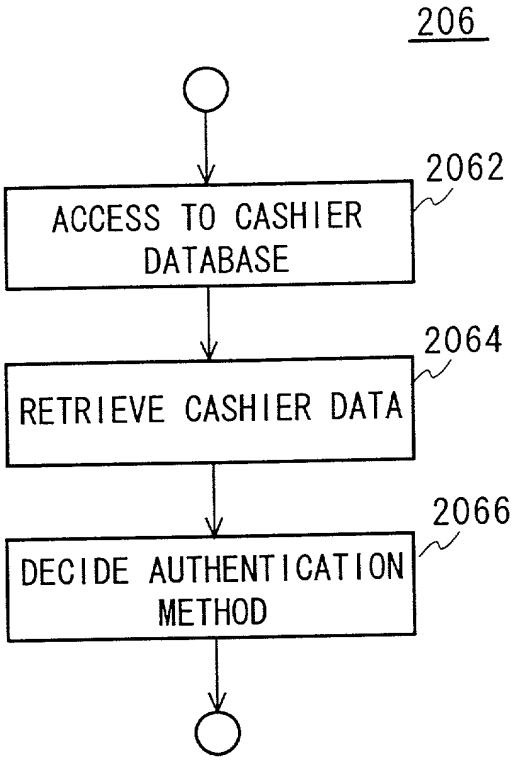

206
2062
ACCESS TO CASHIER DATABASE
2064
RETRIEVE CASHIER DATA
2066
DECIDE AUTHENTICATION METHOD

FIG. 17

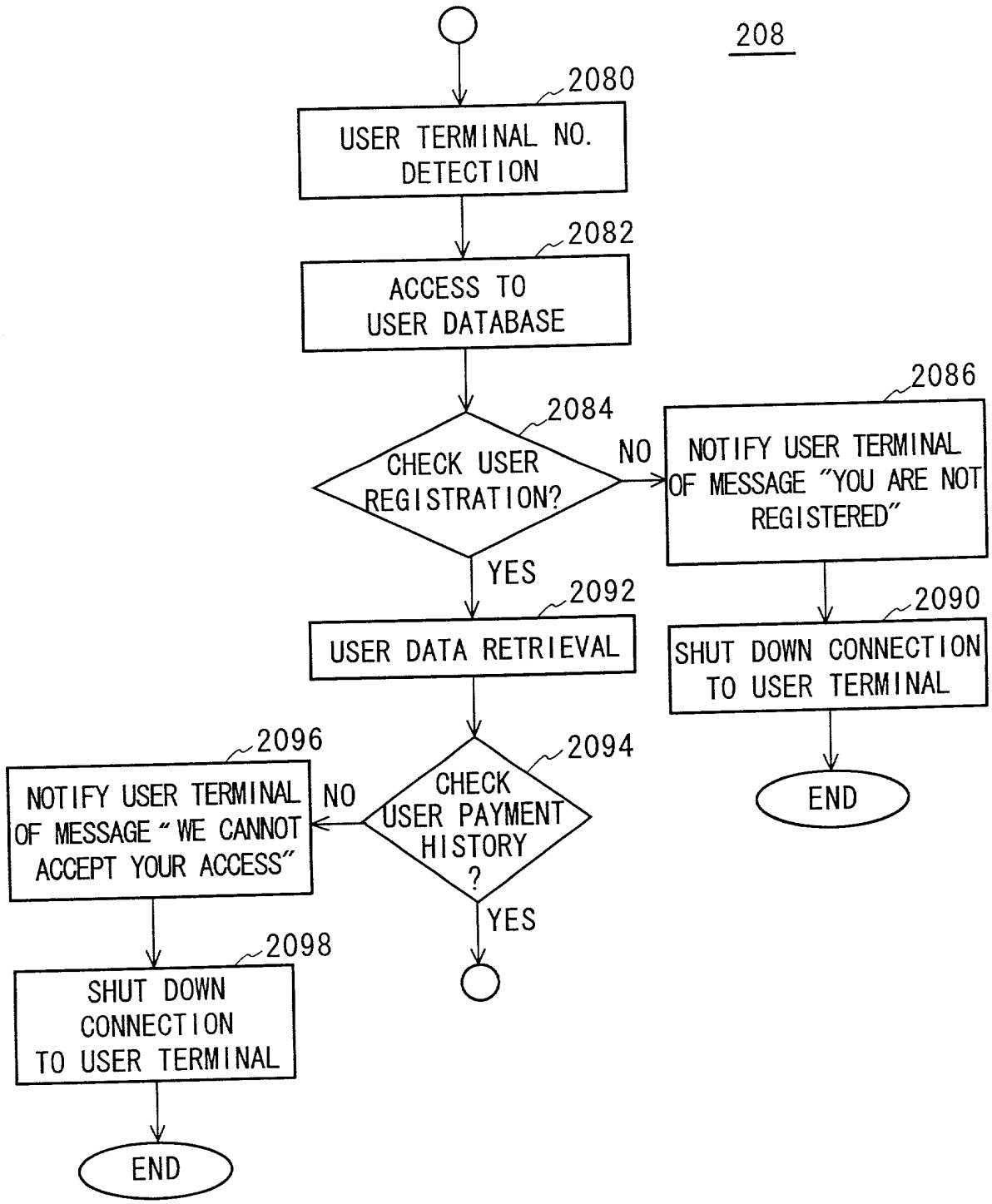

208
2080
USER TERMINAL NO. DETECTION
2082
ACCESS TO USER DATABASE
2084
CHECK USER REGISTRATION?
NO
2086
NOTIFY USER TERMINAL OF MESSAGE "YOU ARE NOT REGISTERED"
YES
2092
USER DATA RETRIEVAL
2090
SHUT DOWN CONNECTION TO USER TERMINAL
END
2094
CHECK USER PAYMENT HISTORY ?
NO
2096
NOTIFY USER TERMINAL OF MESSAGE "WE CANNOT ACCEPT YOUR ACCESS"
YES
2098
SHUT DOWN CONNECTION TO USER TERMINAL
END

FIG. 18

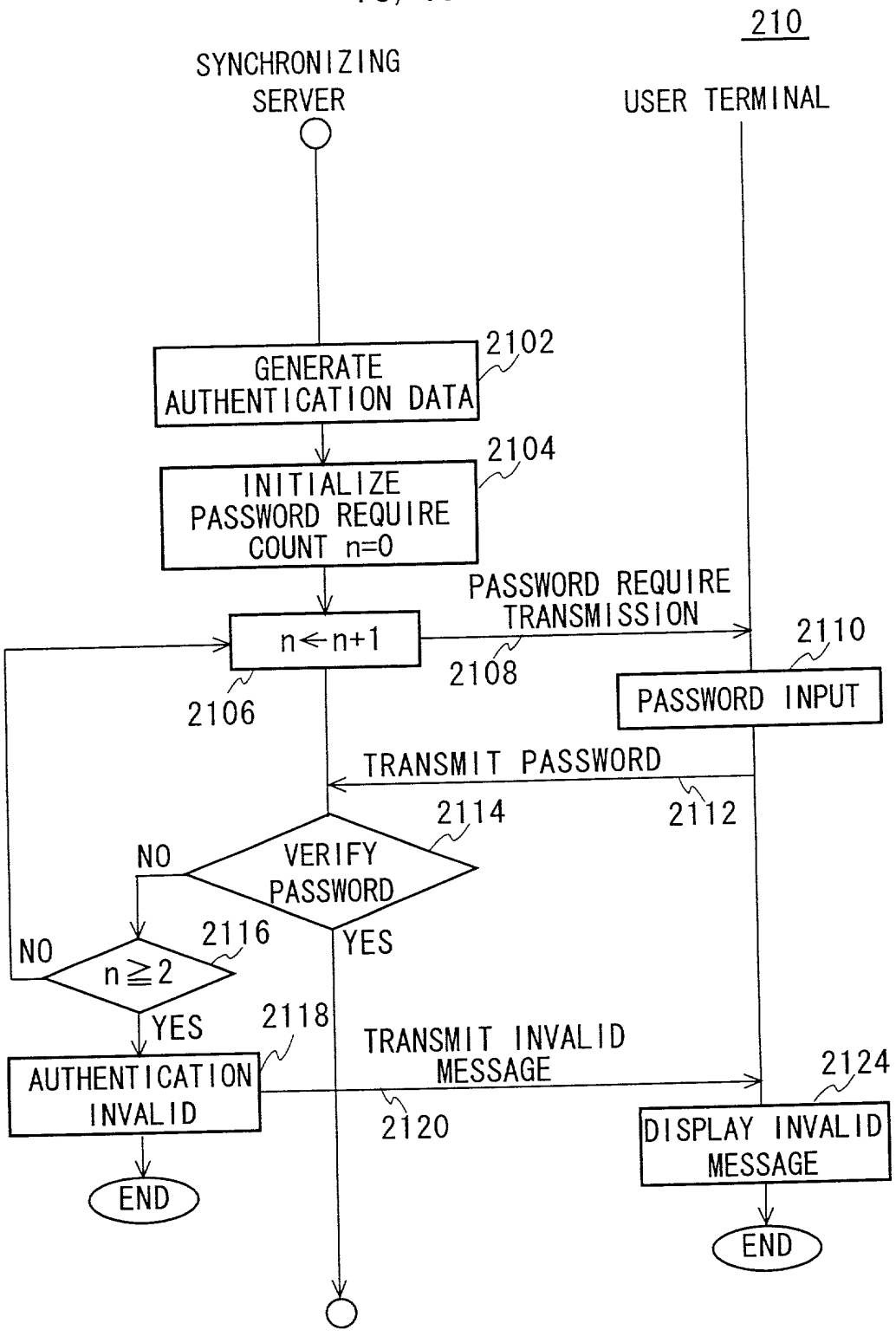

210
SYNCHRONIZING SERVER
USER TERMINAL
GENERATE AUTHENTICATION DATA
2102
INITIALIZE PASSWORD REQUIRE COUNT n=0
2104
PASSWORD REQUIRE TRANSMISSION
n←n+1
2108
2110
2106
PASSWORD INPUT
TRANSMIT PASSWORD
2112
2114
VERIFY PASSWORD
NO
YES
NO
2116
n≧2
YES
2118
TRANSMIT INVALID MESSAGE
AUTHENTICATION INVALID
2120
2124
DISPLAY INVALID MESSAGE
END
END

FIG. 19

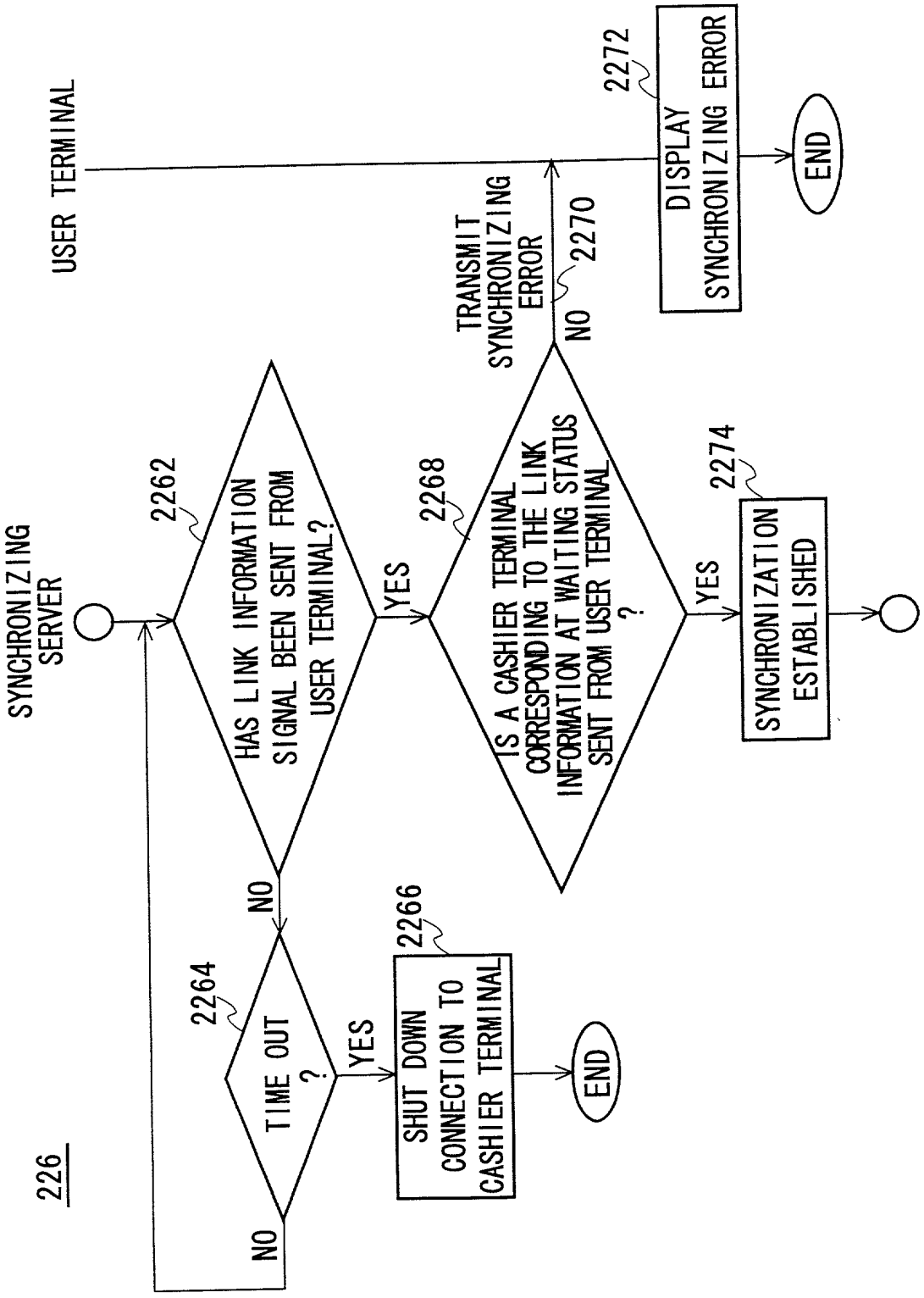

226
SYNCHRONIZING SERVER
USER TERMINAL
2262
HAS LINK INFORMATION SIGNAL BEEN SENT FROM USER TERMINAL?
YES
NO
2264
TIME OUT ?
YES
NO
2266
SHUT DOWN CONNECTION TO CASHIER TERMINAL
END
2268
IS A CASHIER TERMINAL CORRESPONDING TO THE LINK INFORMATION AT WAITING STATUS SENT FROM USER TERMINAL ?
YES
NO
2270
TRANSMIT SYNCHRONIZING ERROR
2272
DISPLAY SYNCHRONIZING ERROR
END
2274
SYNCHRONIZATION ESTABLISHED

FIG. 20

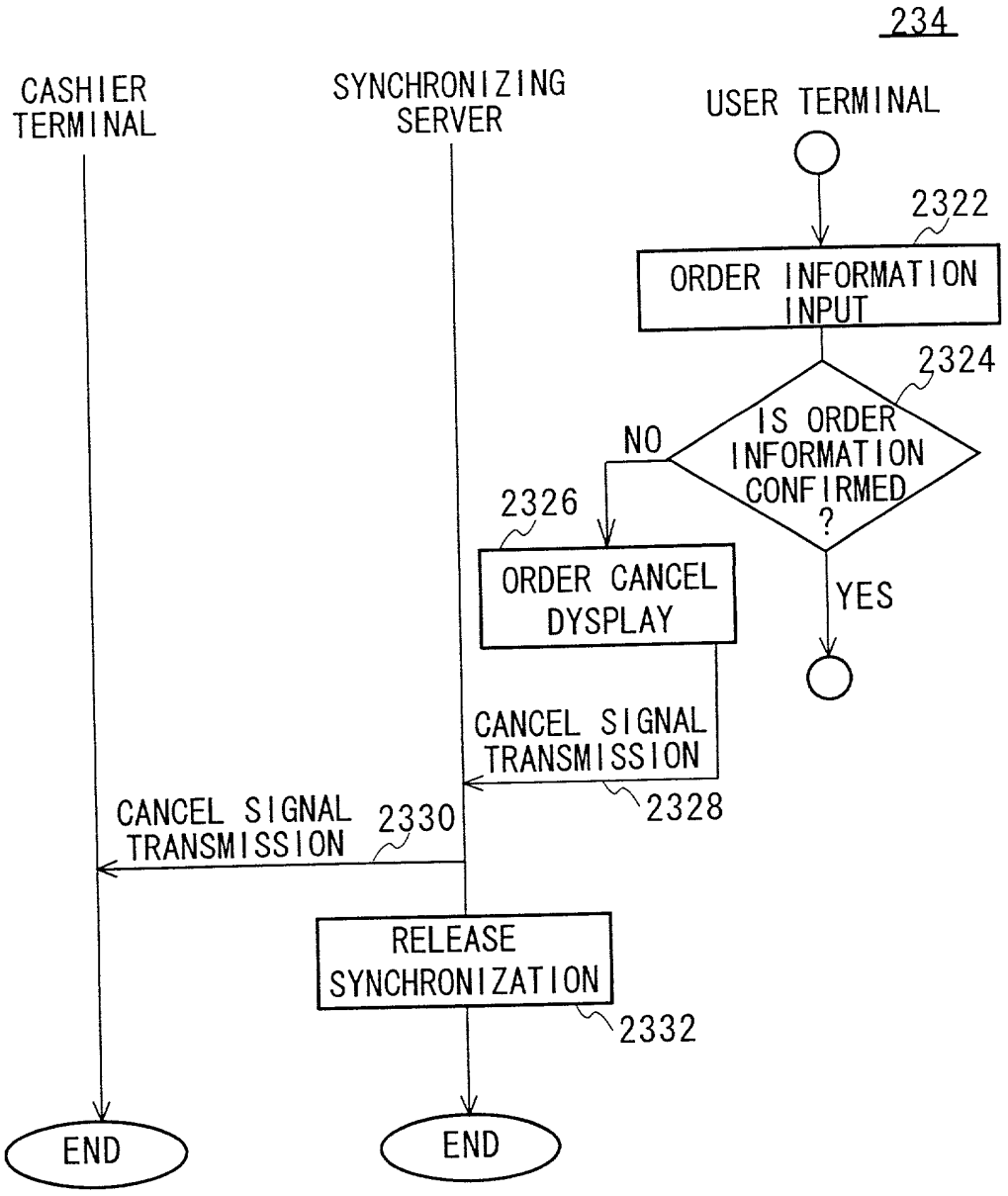

234
CASHIER TERMINAL
SYNCHRONIZING SERVER
USER TERMINAL
2322
ORDER INFORMATION INPUT
2324
IS ORDER INFORMATION CONFIRMED ?
NO
YES
2326
ORDER CANCEL DYSPLAY
CANCEL SIGNAL TRANSMISSION
2328
CANCEL SIGNAL TRANSMISSION
2330
RELEASE SYNCHRONIZATION
2332
END
END

FIG. 21

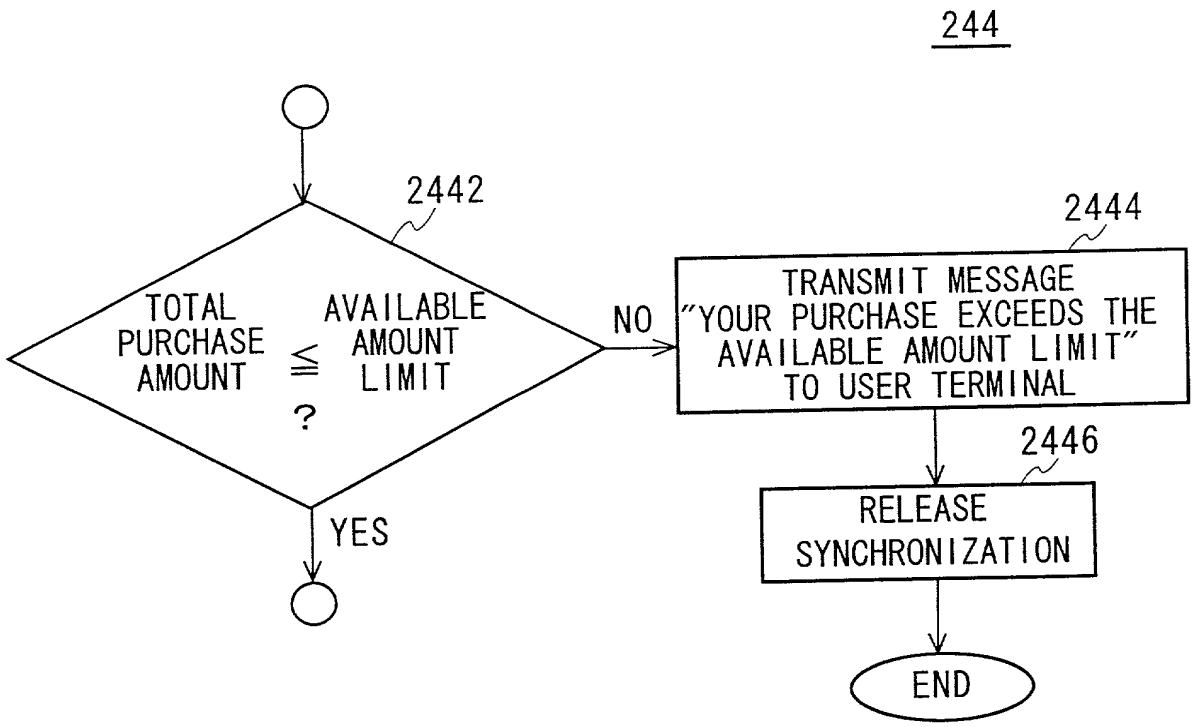

244
2442
TOTAL PURCHASE AMOUNT ≦ AVAILABLE AMOUNT LIMIT ?
NO
YES
2444
TRANSMIT MESSAGE "YOUR PURCHASE EXCEEDS THE AVAILABLE AMOUNT LIMIT" TO USER TERMINAL
2446
RELEASE SYNCHRONIZATION
END

FIG. 22

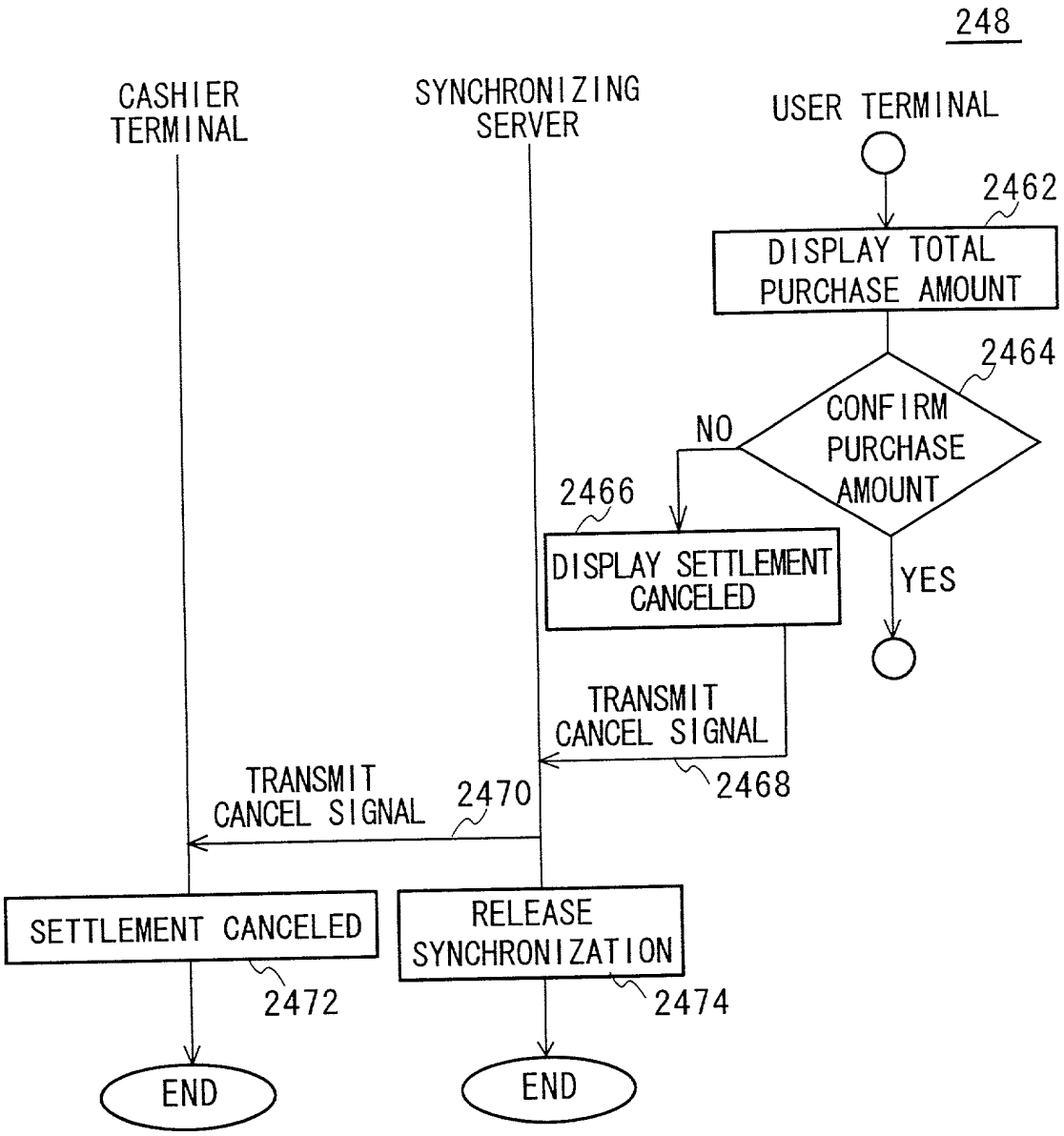

248
CASHIER TERMINAL
SYNCHRONIZING SERVER
USER TERMINAL
2462
DISPLAY TOTAL PURCHASE AMOUNT
2464
CONFIRM PURCHASE AMOUNT
NO
YES
2466
DISPLAY SETTLEMENT CANCELED
TRANSMIT CANCEL SIGNAL
2468
TRANSMIT CANCEL SIGNAL
2470
SETTLEMENT CANCELED
2472
RELEASE SYNCHRONIZATION
2474
END
END

FIG. 23

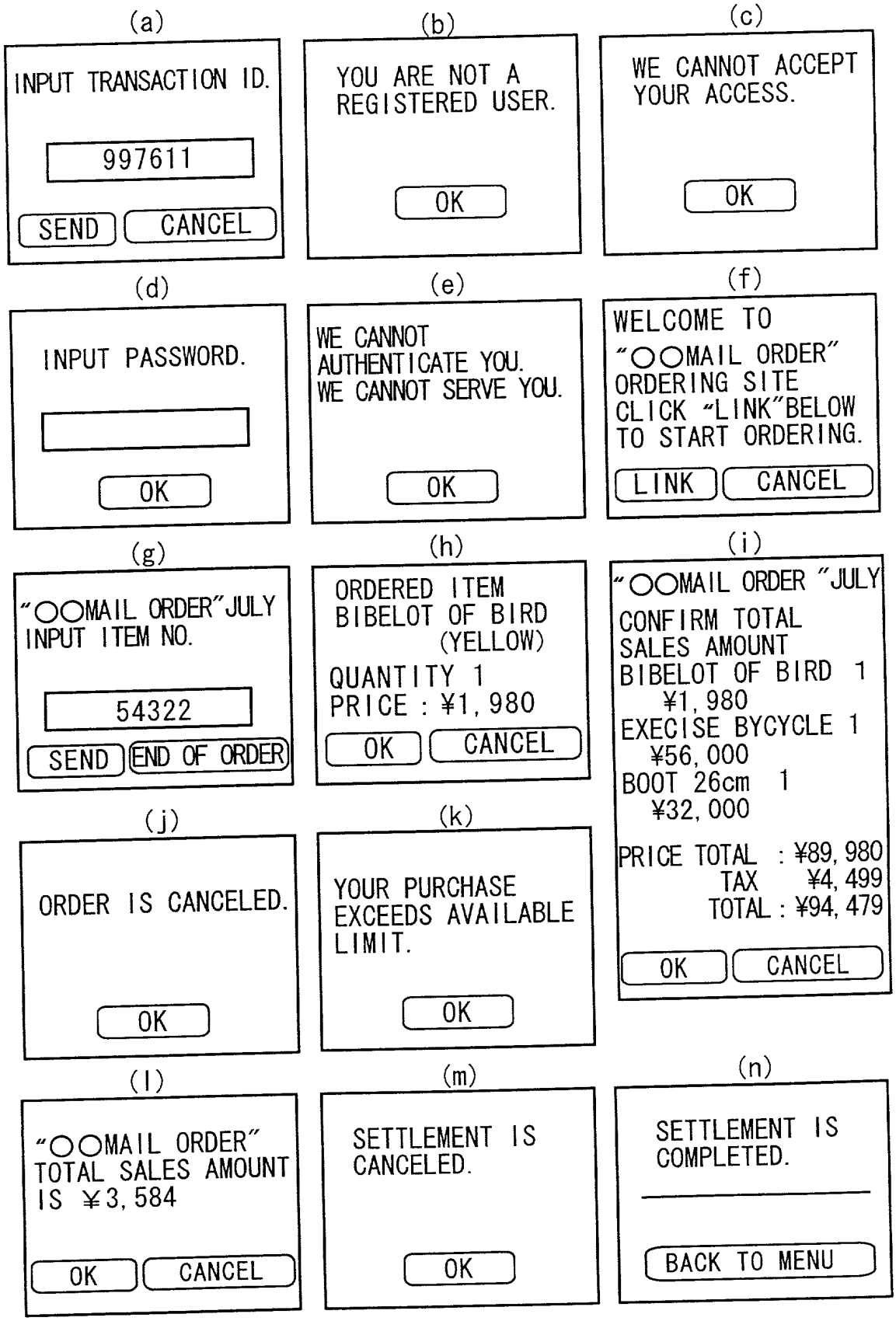

(a)
INPUT TRANSACTION ID.
997611
SEND
CANCEL
(b)
YOU ARE NOT A REGISTERED USER.
OK
(c)
WE CANNOT ACCEPT YOUR ACCESS.
OK
(d)
INPUT PASSWORD.
OK
(e)
WE CANNOT AUTHENTICATE YOU. WE CANNOT SERVE YOU.
OK
(f)
WELCOME TO "○○MAIL ORDER" ORDERING SITE CLICK "LINK"BELOW TO START ORDERING.
LINK
CANCEL
(g)
"○○MAIL ORDER"JULY INPUT ITEM NO.
54322
SEND
END OF ORDER
(h)
ORDERED ITEM
BIBELOT OF BIRD (YELLOW)
QUANTITY 1
PRICE : ¥1,980
OK
CANCEL
(i)
"○○MAIL ORDER "JULY
CONFIRM TOTAL SALES AMOUNT
BIBELOT OF BIRD 1 ¥1,980
EXECISE BYCYCLE 1 ¥56,000
BOOT 26cm 1 ¥32,000
PRICE TOTAL : ¥89,980
TAX ¥4,499
TOTAL : ¥94,479
OK
CANCEL
(j)
ORDER IS CANCELED.
OK
(k)
YOUR PURCHASE EXCEEDS AVAILABLE LIMIT.
OK
(l)
"○○MAIL ORDER" TOTAL SALES AMOUNT IS ¥3,584
OK
CANCEL
(m)
SETTLEMENT IS CANCELED.
OK
(n)
SETTLEMENT IS COMPLETED.
BACK TO MENU

FIG. 24

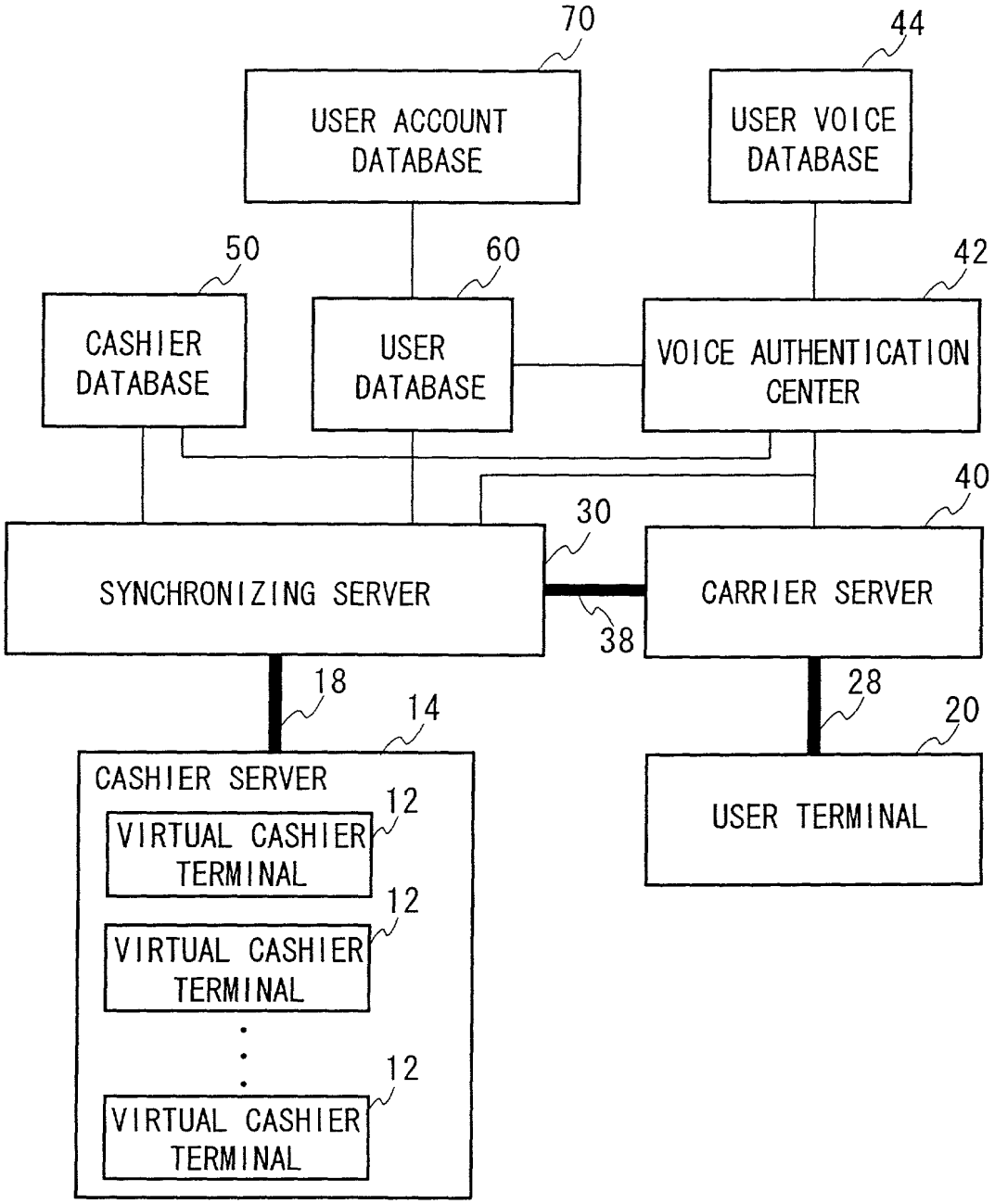

70
USER ACCOUNT DATABASE
44
USER VOICE DATABASE
50
CASHIER DATABASE
60
USER DATABASE
42
VOICE AUTHENTICATION CENTER
40
30
SYNCHRONIZING SERVER
CARRIER SERVER
38
18
14
28
20
CASHIER SERVER
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
USER TERMINAL

FIG. 25

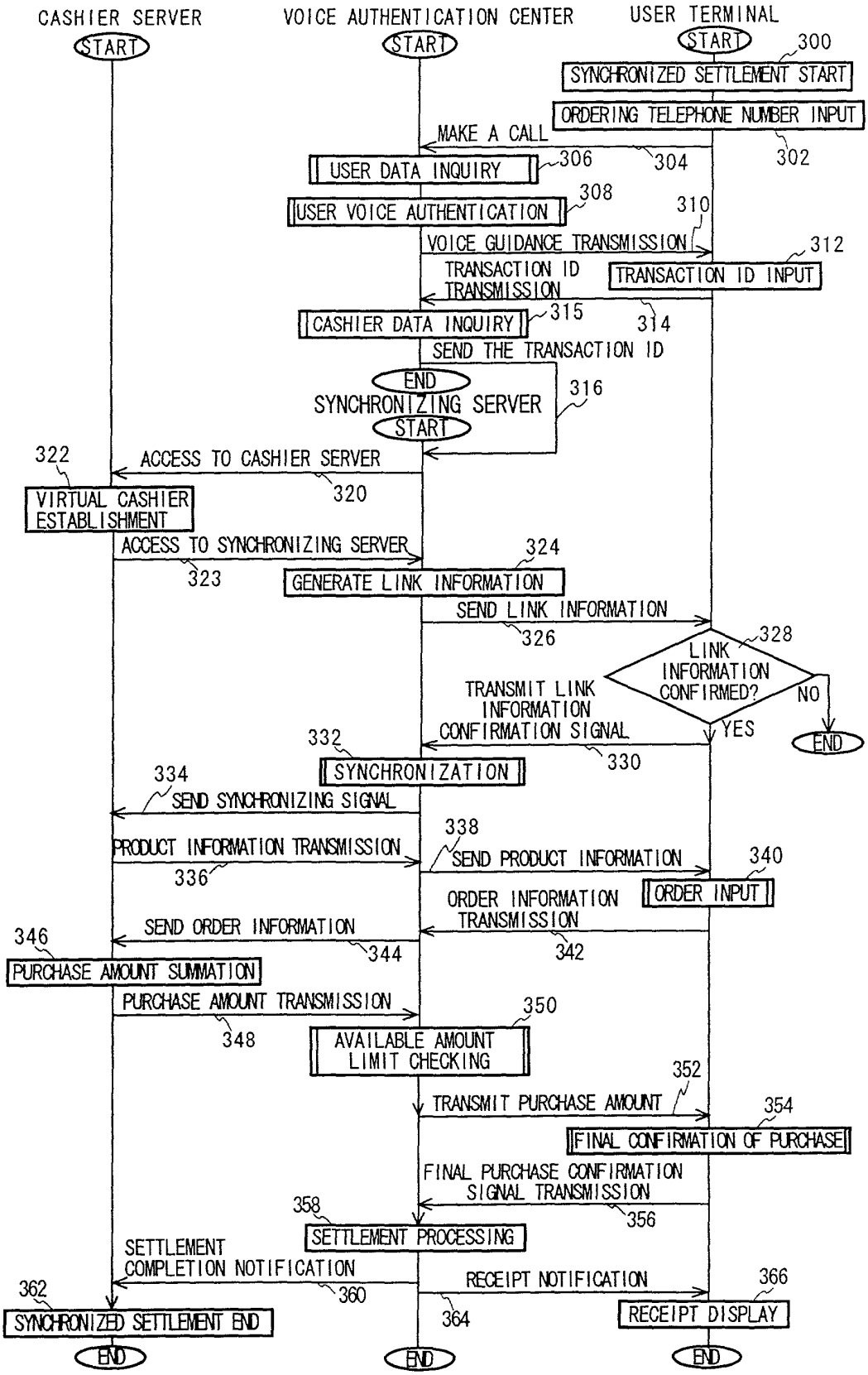

CASHIER SERVER
VOICE AUTHENTICATION CENTER
USER TERMINAL
START
START
START
300
SYNCHRONIZED SETTLEMENT START
ORDERING TELEPHONE NUMBER INPUT
MAKE A CALL
304
302
USER DATA INQUIRY
306
USER VOICE AUTHENTICATION
308
310
VOICE GUIDANCE TRANSMISSION
312
TRANSACTION ID INPUT
TRANSACTION ID TRANSMISSION
314
CASHIER DATA INQUIRY
315
SEND THE TRANSACTION ID
END
SYNCHRONIZING SERVER
START
316
322
ACCESS TO CASHIER SERVER
320
VIRTUAL CASHIER ESTABLISHMENT
ACCESS TO SYNCHRONIZING SERVER
323
324
GENERATE LINK INFORMATION
SEND LINK INFORMATION
326
328
LINK INFORMATION CONFIRMED?
NO
YES
END
TRANSMIT LINK INFORMATION CONFIRMATION SIGNAL
330
332
SYNCHRONIZATION
334
SEND SYNCHRONIZING SIGNAL
PRODUCT INFORMATION TRANSMISSION
336
338
SEND PRODUCT INFORMATION
340
ORDER INPUT
ORDER INFORMATION TRANSMISSION
342
SEND ORDER INFORMATION
344
346
PURCHASE AMOUNT SUMMATION
PURCHASE AMOUNT TRANSMISSION
348
350
AVAILABLE AMOUNT LIMIT CHECKING
352
TRANSMIT PURCHASE AMOUNT
354
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
356
358
SETTLEMENT PROCESSING
SETTLEMENT COMPLETION NOTIFICATION
360
RECEIPT NOTIFICATION
364
366
362
SYNCHRONIZED SETTLEMENT END
RECEIPT DISPLAY
END
END
END

FIG. 26

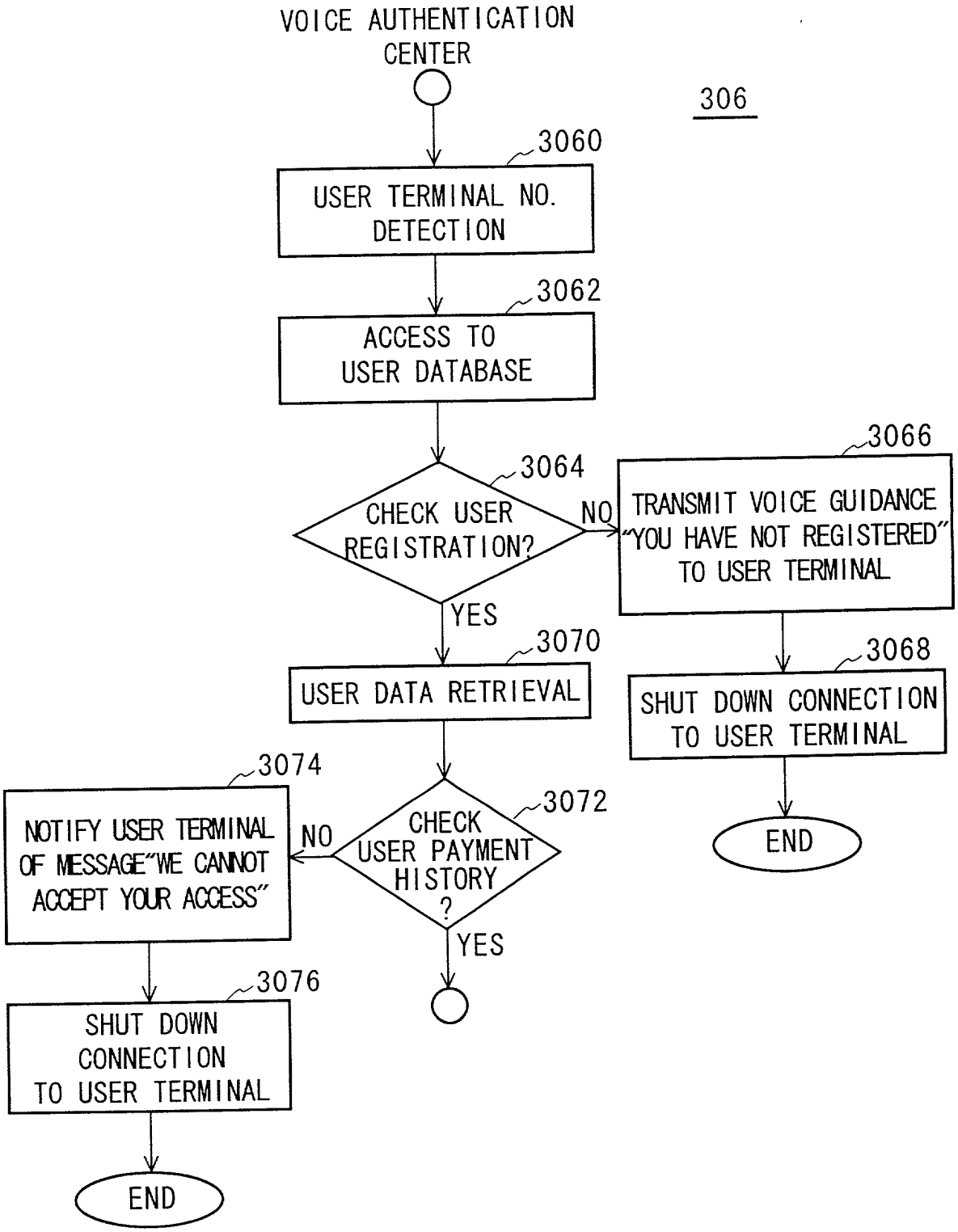

VOICE AUTHENTICATION CENTER
306
3060
USER TERMINAL NO. DETECTION
3062
ACCESS TO USER DATABASE
3064
CHECK USER REGISTRATION?
NO
3066
TRANSMIT VOICE GUIDANCE "YOU HAVE NOT REGISTERED" TO USER TERMINAL
YES
3070
USER DATA RETRIEVAL
3068
SHUT DOWN CONNECTION TO USER TERMINAL
END
3074
NOTIFY USER TERMINAL OF MESSAGE "WE CANNOT ACCEPT YOUR ACCESS"
NO
3072
CHECK USER PAYMENT HISTORY ?
YES
3076
SHUT DOWN CONNECTION TO USER TERMINAL
END

FIG. 27

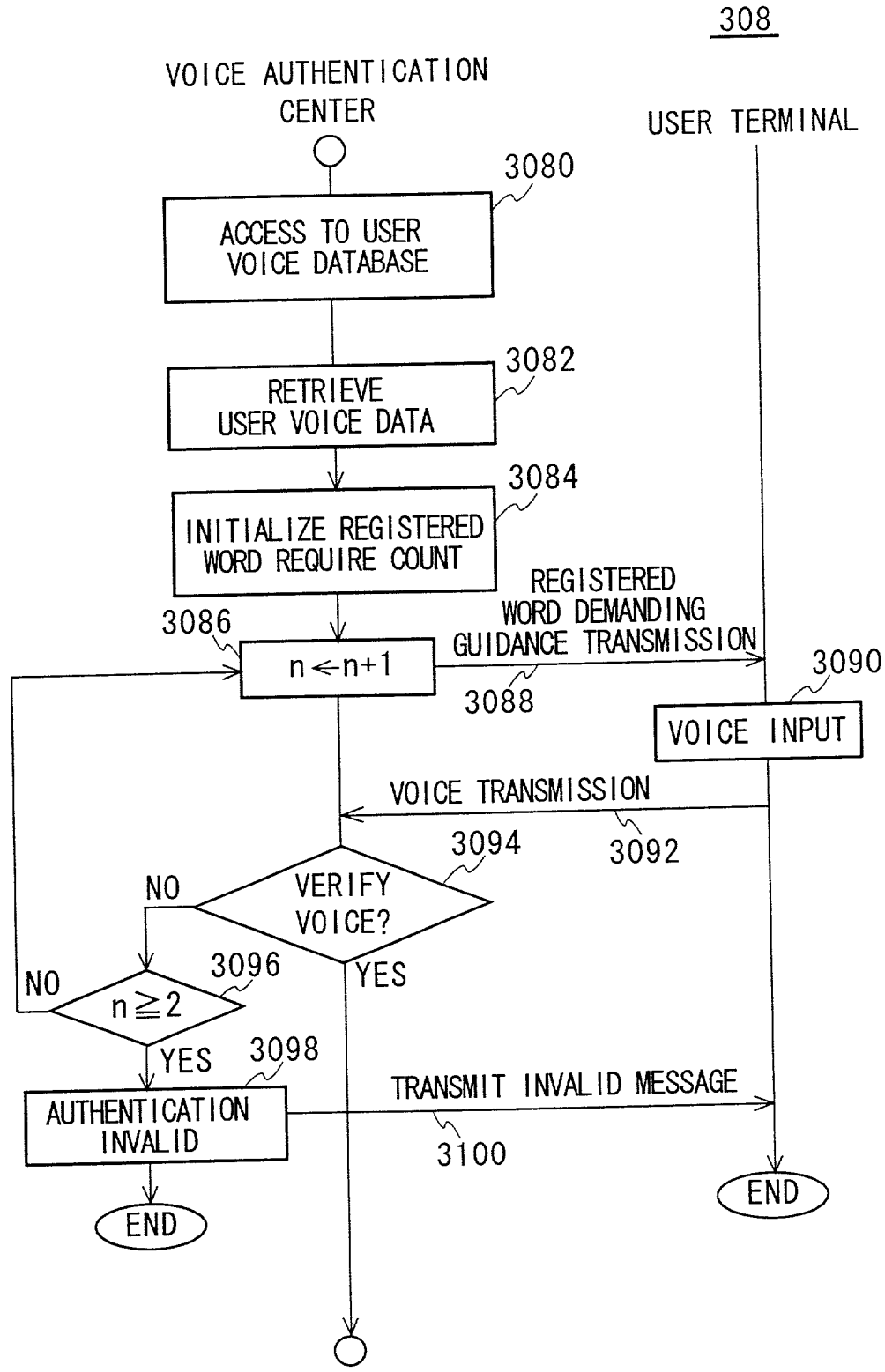

308
VOICE AUTHENTICATION CENTER
USER TERMINAL
3080
ACCESS TO USER VOICE DATABASE
3082
RETRIEVE USER VOICE DATA
3084
INITIALIZE REGISTERED WORD REQUIRE COUNT
3086
n←n+1
REGISTERED WORD DEMANDING GUIDANCE TRANSMISSION
3088
3090
VOICE INPUT
VOICE TRANSMISSION
3092
3094
VERIFY VOICE?
NO
YES
3096
n≧2
NO
YES
3098
AUTHENTICATION INVALID
TRANSMIT INVALID MESSAGE
3100
END
END

FIG. 28

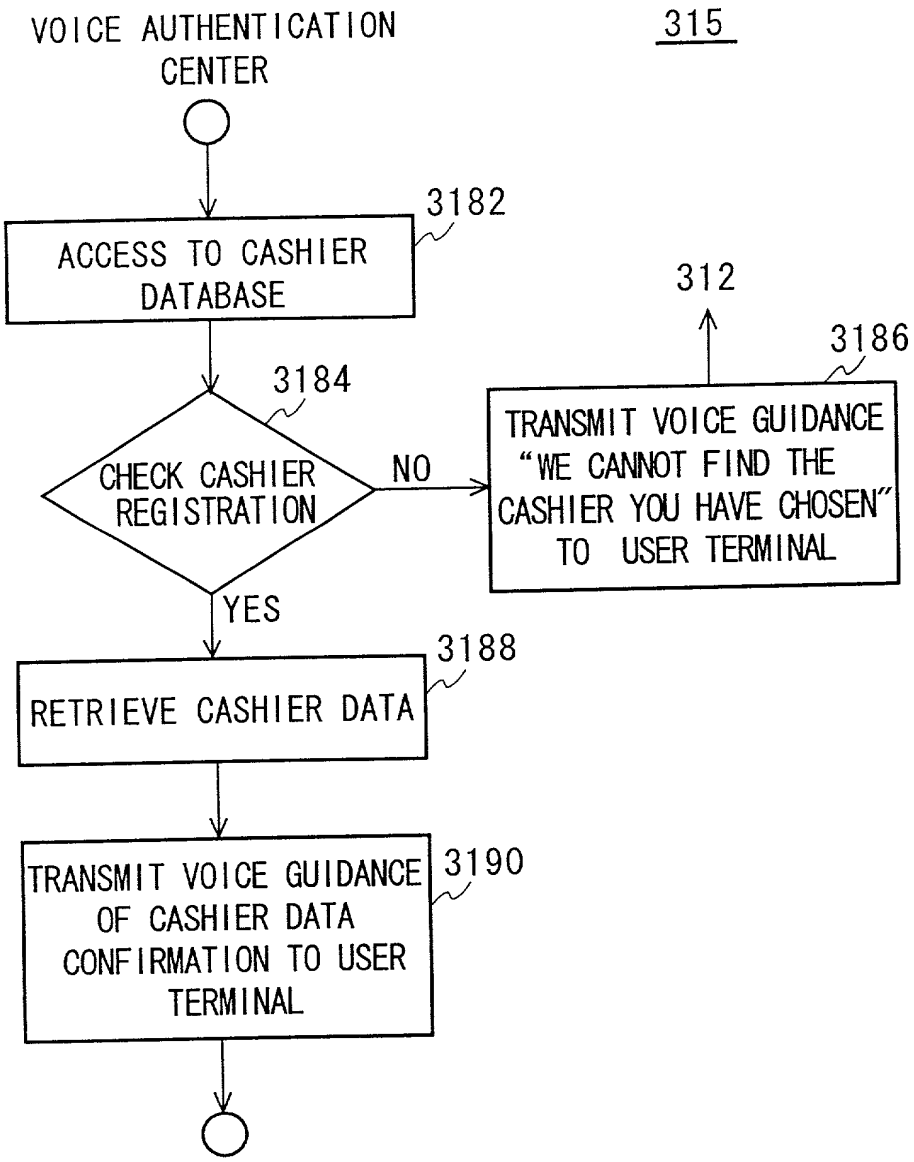

VOICE AUTHENTICATION CENTER
315
ACCESS TO CASHIER DATABASE
3182
CHECK CASHIER REGISTRATION
3184
NO
312
3186
TRANSMIT VOICE GUIDANCE "WE CANNOT FIND THE CASHIER YOU HAVE CHOSEN" TO USER TERMINAL
YES
RETRIEVE CASHIER DATA
3188
TRANSMIT VOICE GUIDANCE OF CASHIER DATA CONFIRMATION TO USER TERMINAL
3190

FIG. 29

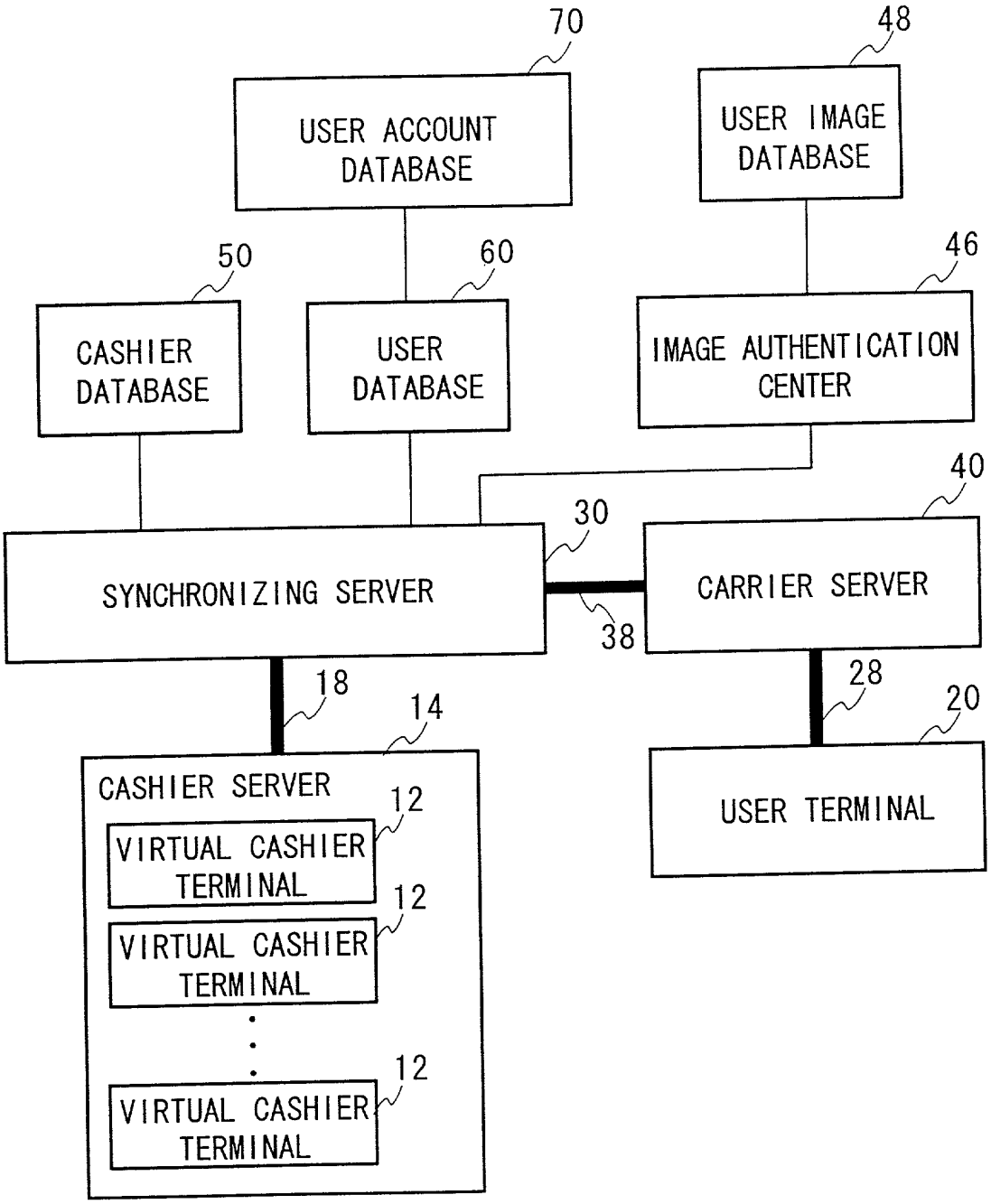

70
USER ACCOUNT DATABASE
48
USER IMAGE DATABASE
50
CASHIER DATABASE
60
USER DATABASE
46
IMAGE AUTHENTICATION CENTER
40
30
SYNCHRONIZING SERVER
CARRIER SERVER
38
18
14
28
20
CASHIER SERVER
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
USER TERMINAL

FIG. 30

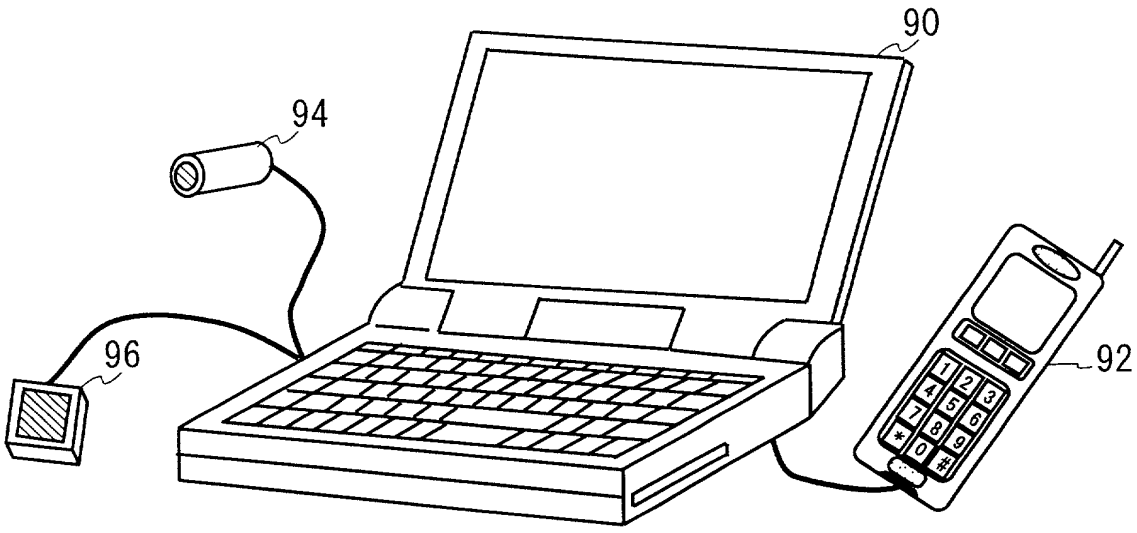


FIG. 31

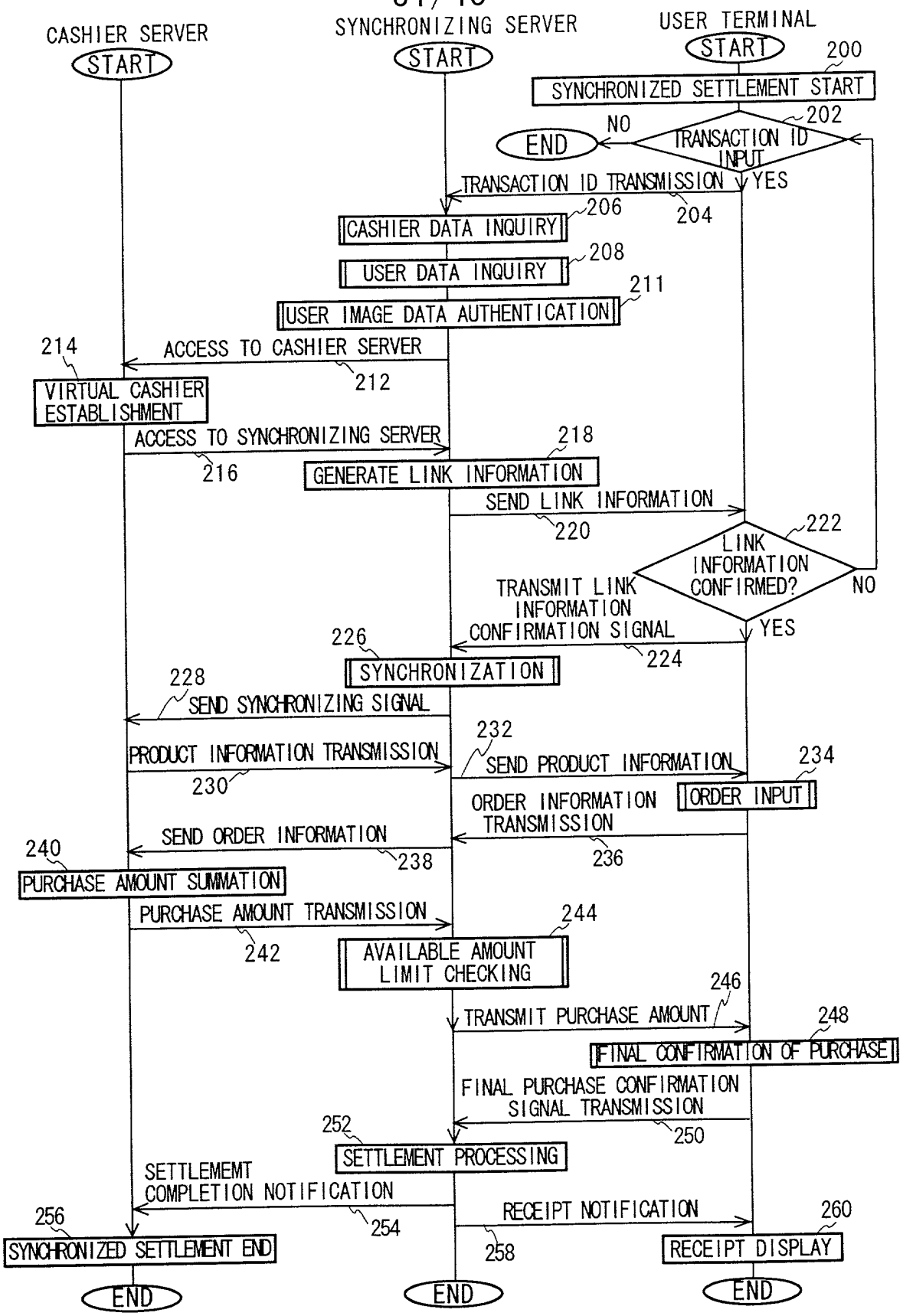

CASHIER SERVER
SYNCHRONIZING SERVER
USER TERMINAL
START
START
START
200
SYNCHRONIZED SETTLEMENT START
202
TRANSACTION ID INPUT
NO
END
YES
TRANSACTION ID TRANSMISSION
204
206
CASHIER DATA INQUIRY
208
USER DATA INQUIRY
211
USER IMAGE DATA AUTHENTICATION
214
ACCESS TO CASHIER SERVER
212
VIRTUAL CASHIER ESTABLISHMENT
ACCESS TO SYNCHRONIZING SERVER
216
218
GENERATE LINK INFORMATION
SEND LINK INFORMATION
220
222
LINK INFORMATION CONFIRMED?
NO
YES
TRANSMIT LINK INFORMATION CONFIRMATION SIGNAL
224
226
SYNCHRONIZATION
228
SEND SYNCHRONIZING SIGNAL
232
PRODUCT INFORMATION TRANSMISSION
230
SEND PRODUCT INFORMATION
234
ORDER INPUT
ORDER INFORMATION TRANSMISSION
236
SEND ORDER INFORMATION
238
240
PURCHASE AMOUNT SUMMATION
PURCHASE AMOUNT TRANSMISSION
242
244
AVAILABLE AMOUNT LIMIT CHECKING
246
TRANSMIT PURCHASE AMOUNT
248
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
250
252
SETTLEMENT PROCESSING
SETTLEMEMT COMPLETION NOTIFICATION
254
RECEIPT NOTIFICATION
256
258
260
SYNCHRONIZED SETTLEMENT END
RECEIPT DISPLAY
END
END
END

FIG. 32

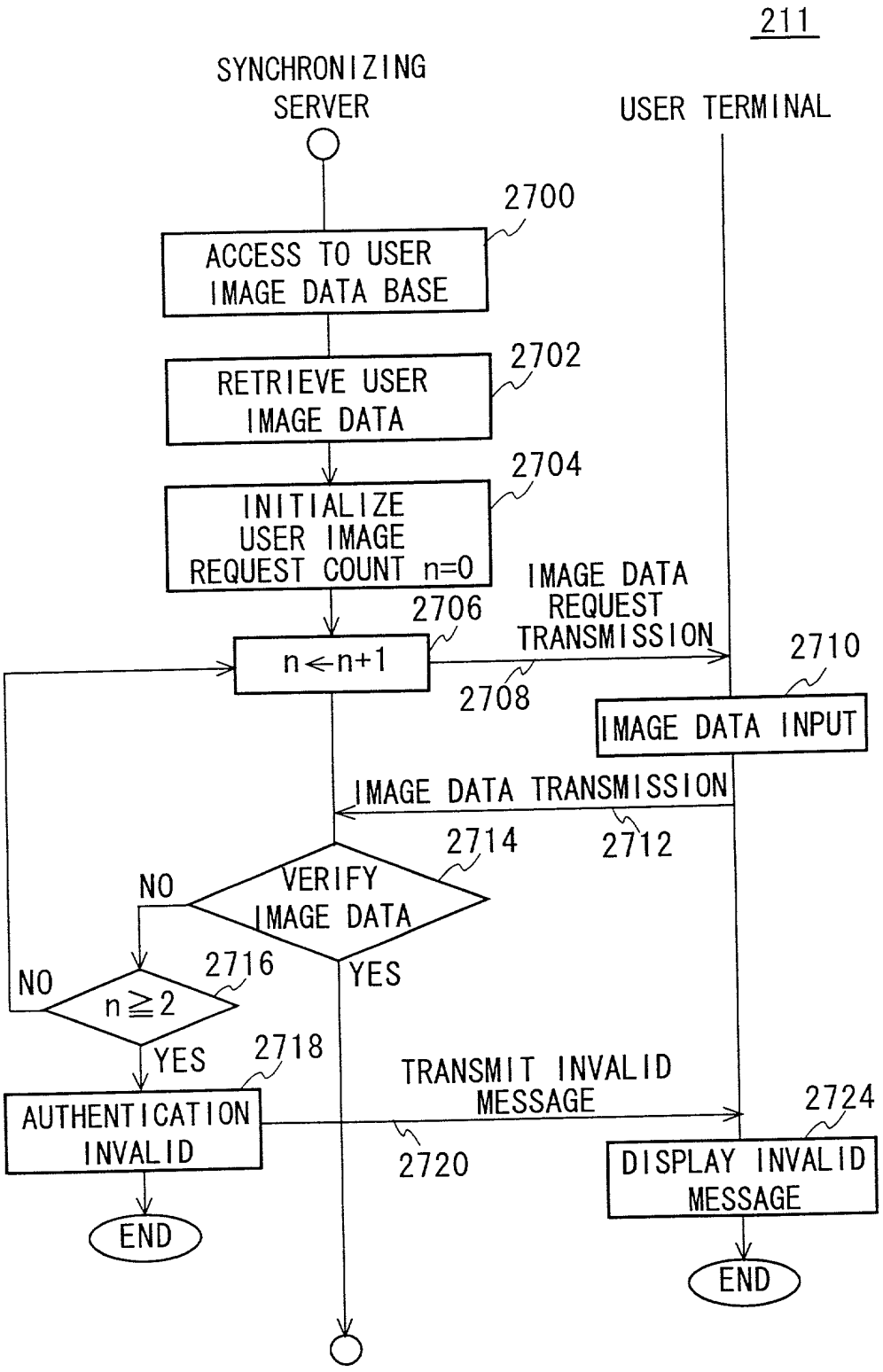

211
SYNCHRONIZING SERVER
USER TERMINAL
2700
ACCESS TO USER IMAGE DATA BASE
2702
RETRIEVE USER IMAGE DATA
2704
INITIALIZE USER IMAGE REQUEST COUNT n=0
2706
n←n+1
IMAGE DATA REQUEST TRANSMISSION
2708
2710
IMAGE DATA INPUT
IMAGE DATA TRANSMISSION
2712
2714
VERIFY IMAGE DATA
NO
YES
2716
n≧2
NO
YES
2718
AUTHENTICATION INVALID
TRANSMIT INVALID MESSAGE
2720
2724
DISPLAY INVALID MESSAGE
END
END

FIG. 33

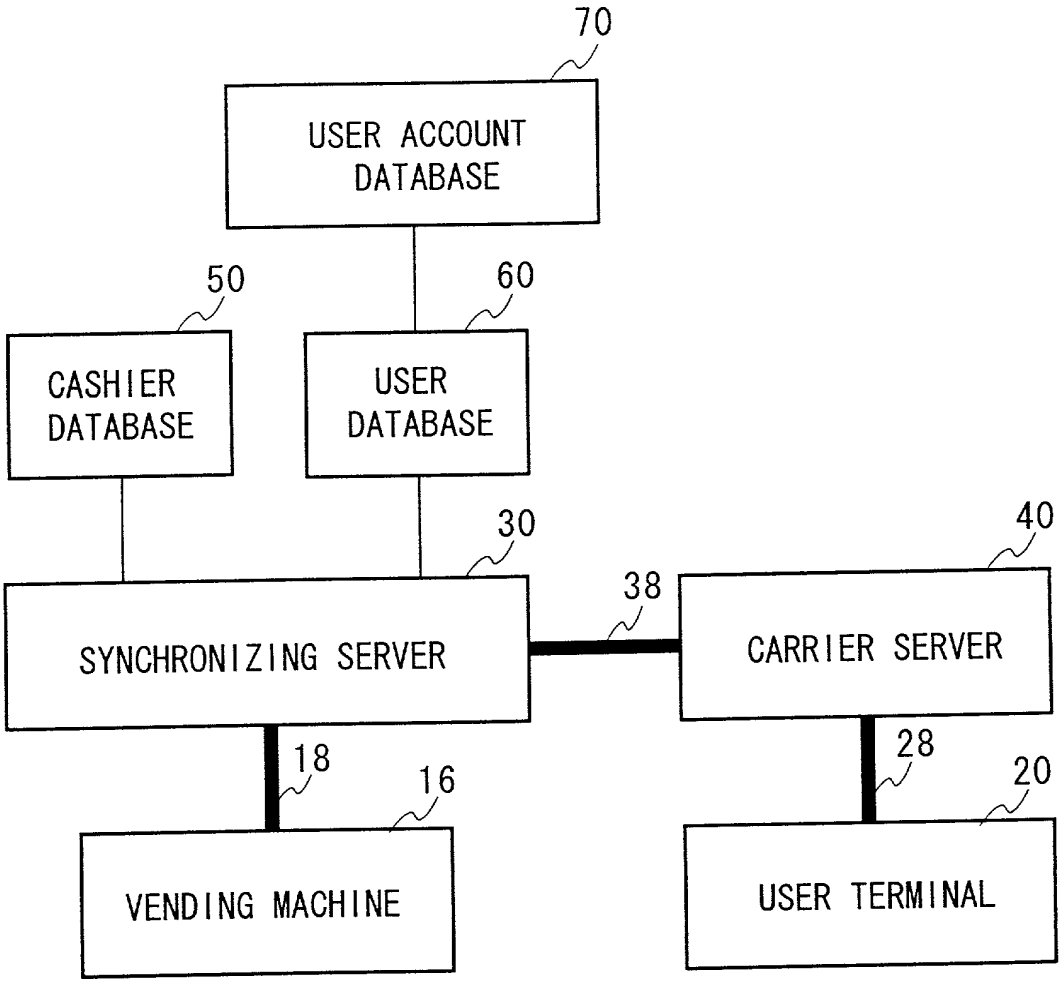

70
USER ACCOUNT DATABASE
50
60
CASHIER DATABASE
USER DATABASE
30
40
38
SYNCHRONIZING SERVER
CARRIER SERVER
18
16
28
20
VENDING MACHINE
USER TERMINAL

FIG. 34

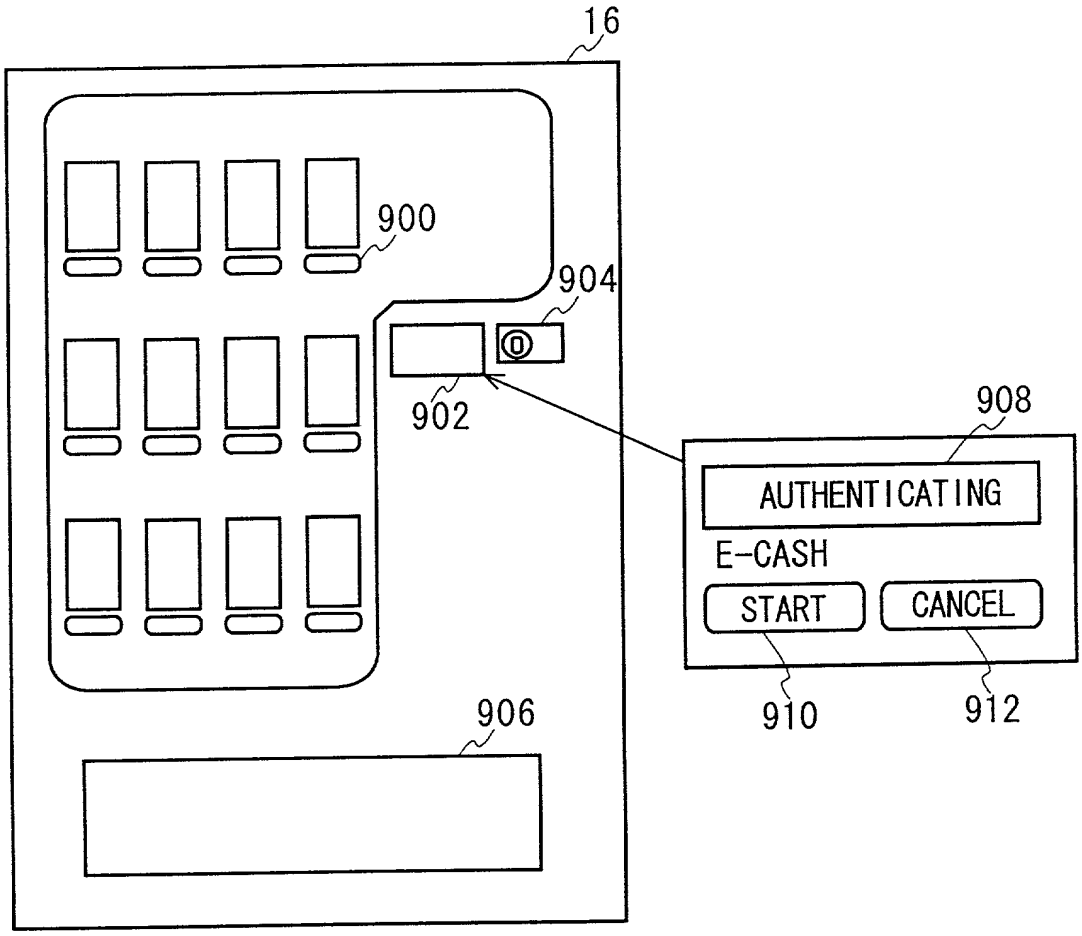

16
900
904
902
908
AUTHENTICATING
E-CASH
START
CANCEL
910
912
906

FIG. 35

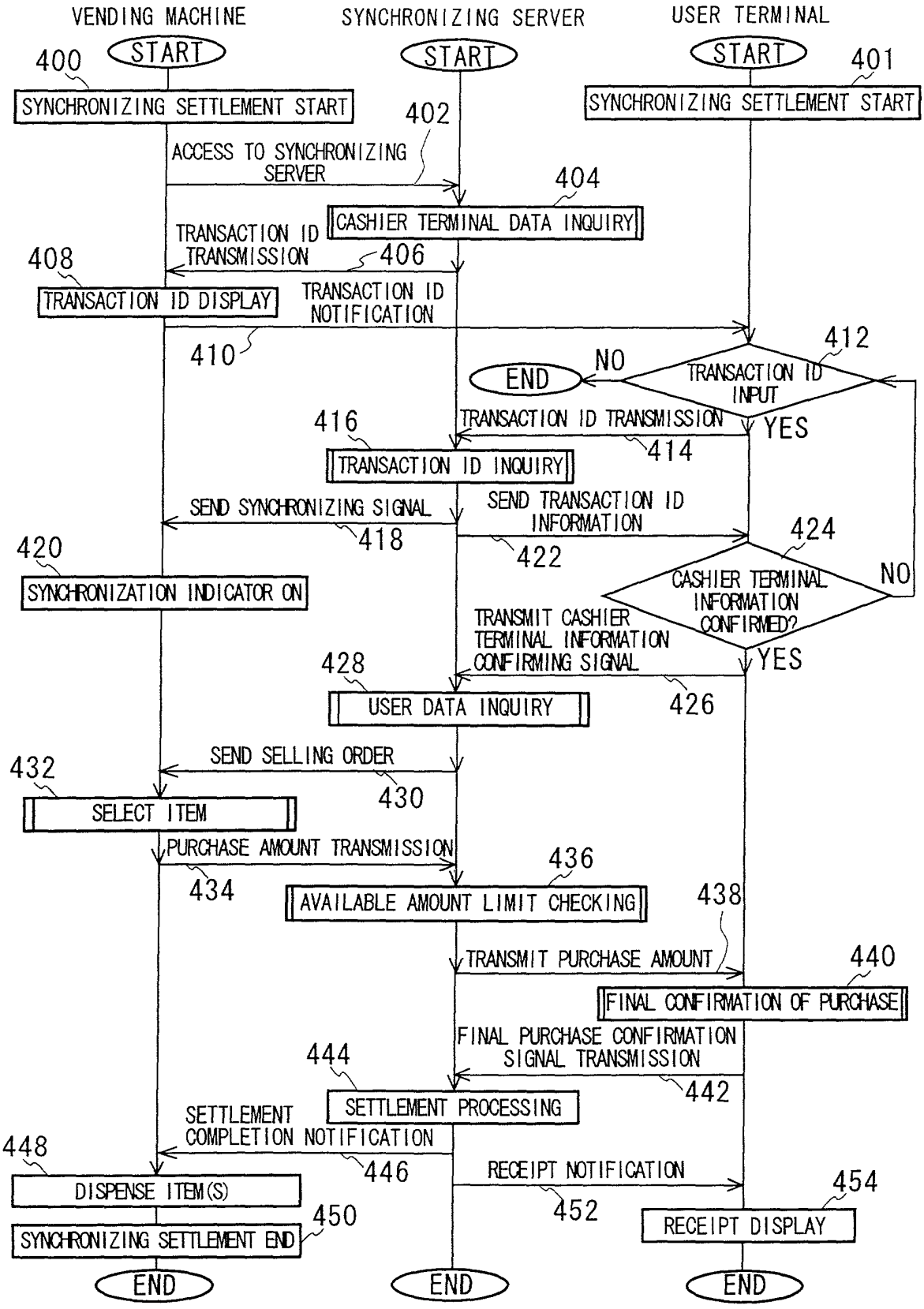

VENDING MACHINE
SYNCHRONIZING SERVER
USER TERMINAL
START
START
START
400
SYNCHRONIZING SETTLEMENT START
401
SYNCHRONIZING SETTLEMENT START
402
ACCESS TO SYNCHRONIZING SERVER
404
CASHIER TERMINAL DATA INQUIRY
TRANSACTION ID TRANSMISSION
406
408
TRANSACTION ID DISPLAY
TRANSACTION ID NOTIFICATION
410
412
END
NO
TRANSACTION ID INPUT
YES
416
TRANSACTION ID TRANSMISSION
414
TRANSACTION ID INQUIRY
SEND SYNCHRONIZING SIGNAL
418
SEND TRANSACTION ID INFORMATION
422
424
420
SYNCHRONIZATION INDICATOR ON
CASHIER TERMINAL INFORMATION CONFIRMED?
NO
TRANSMIT CASHIER TERMINAL INFORMATION CONFIRMING SIGNAL
YES
428
426
USER DATA INQUIRY
SEND SELLING ORDER
430
432
SELECT ITEM
PURCHASE AMOUNT TRANSMISSION
434
436
AVAILABLE AMOUNT LIMIT CHECKING
438
TRANSMIT PURCHASE AMOUNT
440
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
444
442
SETTLEMENT PROCESSING
SETTLEMENT COMPLETION NOTIFICATION
448
446
RECEIPT NOTIFICATION
454
DISPENSE ITEM(S)
452
450
RECEIPT DISPLAY
SYNCHRONIZING SETTLEMENT END
END
END
END

FIG. 36

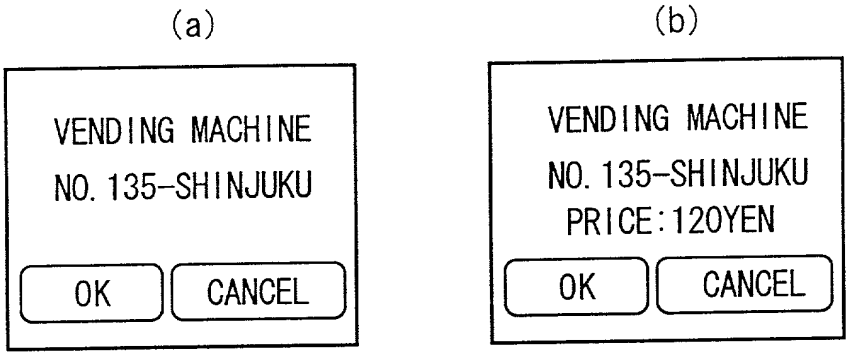


FIG. 37

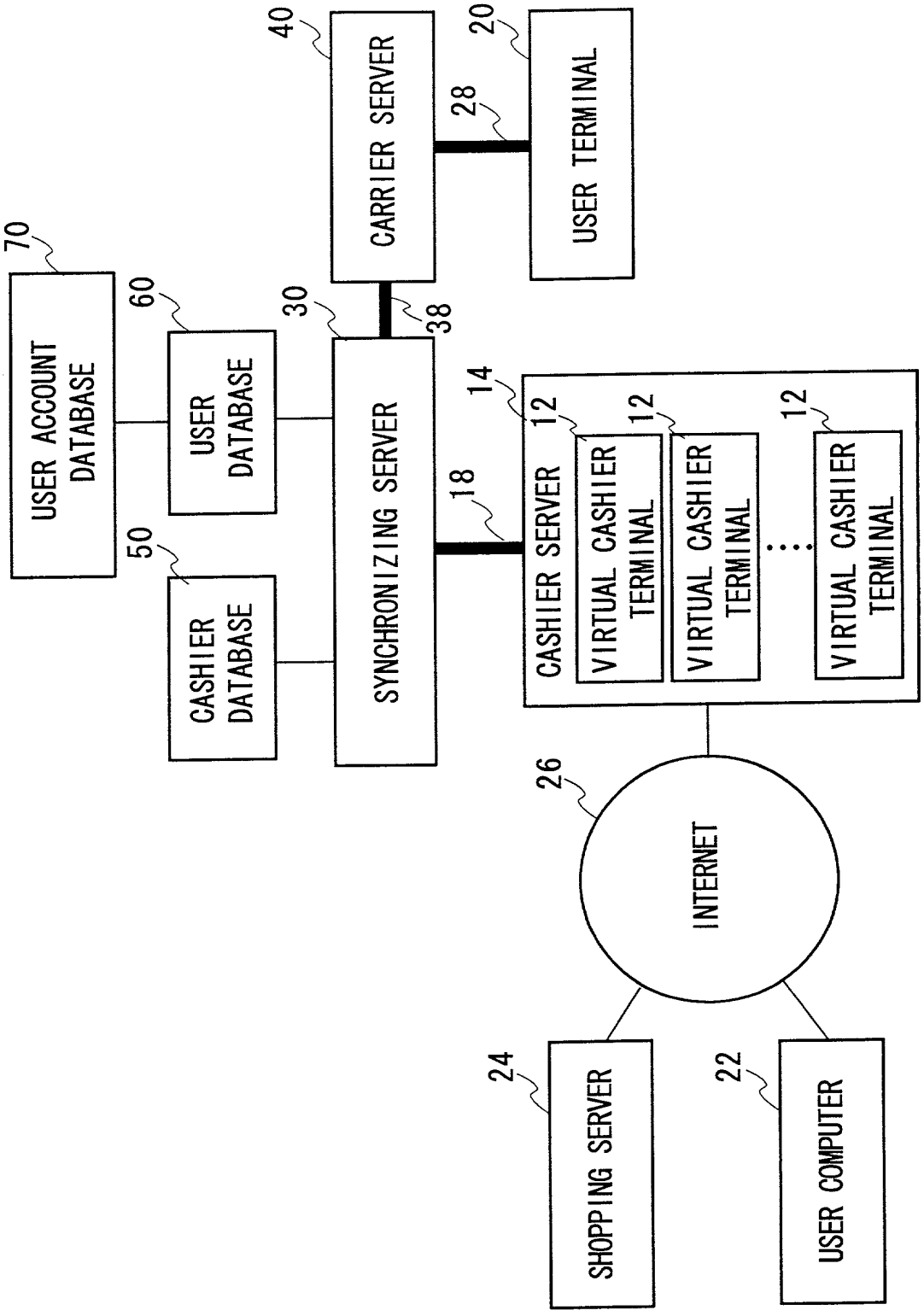

40
CARRIER SERVER
20
USER TERMINAL
28
70
USER ACCOUNT DATABASE
60
USER DATABASE
30
38
SYNCHRONIZING SERVER
14
CASHIER SERVER
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
12
VIRTUAL CASHIER TERMINAL
18
50
CASHIER DATABASE
26
INTERNET
24
SHOPPING SERVER
22
USER COMPUTER

FIG. 38

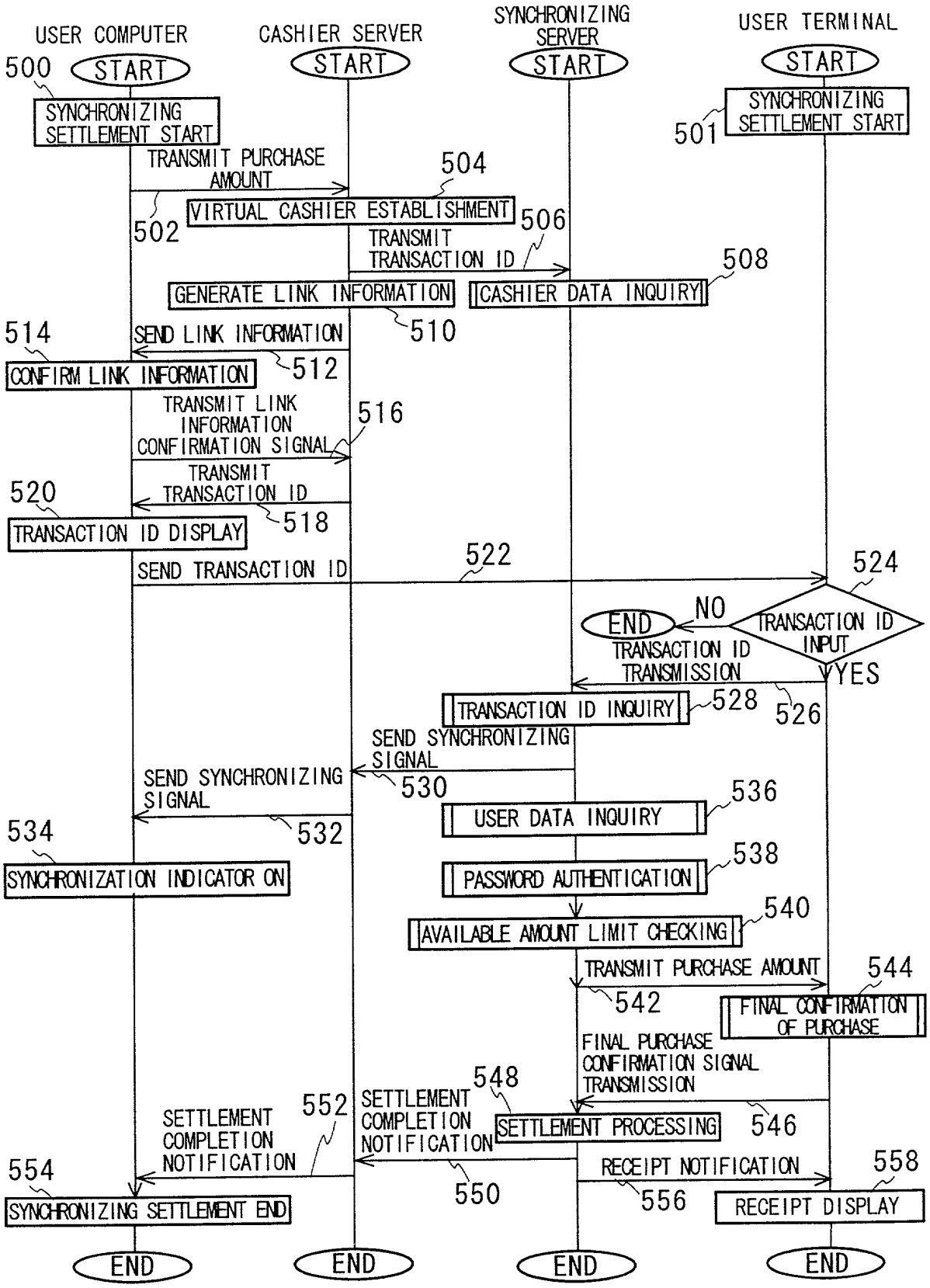

USER COMPUTER
CASHIER SERVER
SYNCHRONIZING SERVER
USER TERMINAL
START
500
SYNCHRONIZING SETTLEMENT START
501
TRANSMIT PURCHASE AMOUNT
502
504
VIRTUAL CASHIER ESTABLISHMENT
506
TRANSMIT TRANSACTION ID
508
GENERATE LINK INFORMATION
510
CASHIER DATA INQUIRY
514
SEND LINK INFORMATION
512
CONFIRM LINK INFORMATION
TRANSMIT LINK INFORMATION CONFIRMATION SIGNAL
516
TRANSMIT TRANSACTION ID
518
520
TRANSACTION ID DISPLAY
SEND TRANSACTION ID
522
524
TRANSACTION ID INPUT
NO
END
YES
TRANSACTION ID TRANSMISSION
526
TRANSACTION ID INQUIRY
528
SEND SYNCHRONIZING SIGNAL
530
SEND SYNCHRONIZING SIGNAL
532
536
USER DATA INQUIRY
534
SYNCHRONIZATION INDICATOR ON
538
PASSWORD AUTHENTICATION
540
AVAILABLE AMOUNT LIMIT CHECKING
TRANSMIT PURCHASE AMOUNT
542
544
FINAL CONFIRMATION OF PURCHASE
FINAL PURCHASE CONFIRMATION SIGNAL TRANSMISSION
546
548
SETTLEMENT PROCESSING
SETTLEMENT COMPLETION NOTIFICATION
552
SETTLEMENT COMPLETION NOTIFICATION
550
554
SYNCHRONIZING SETTLEMENT END
RECEIPT NOTIFICATION
556
558
RECEIPT DISPLAY
END
END
END
END

FIG. 39

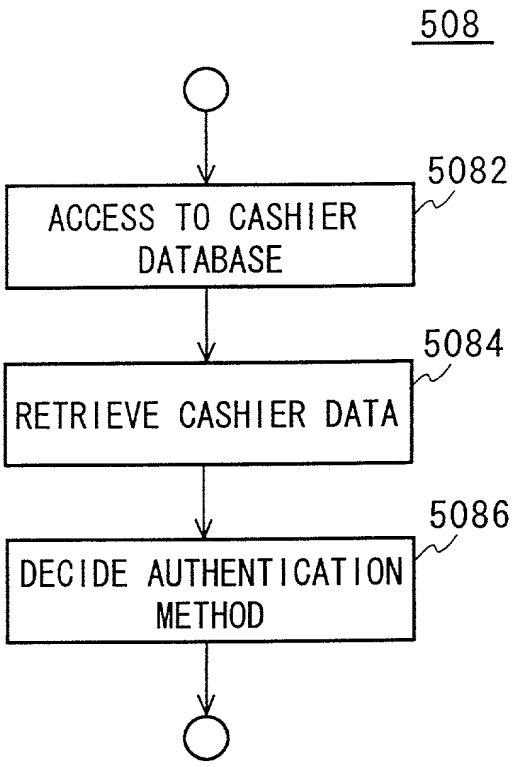

508
5082
ACCESS TO CASHIER DATABASE
5084
RETRIEVE CASHIER DATA
5086
DECIDE AUTHENTICATION METHOD

FIG. 40

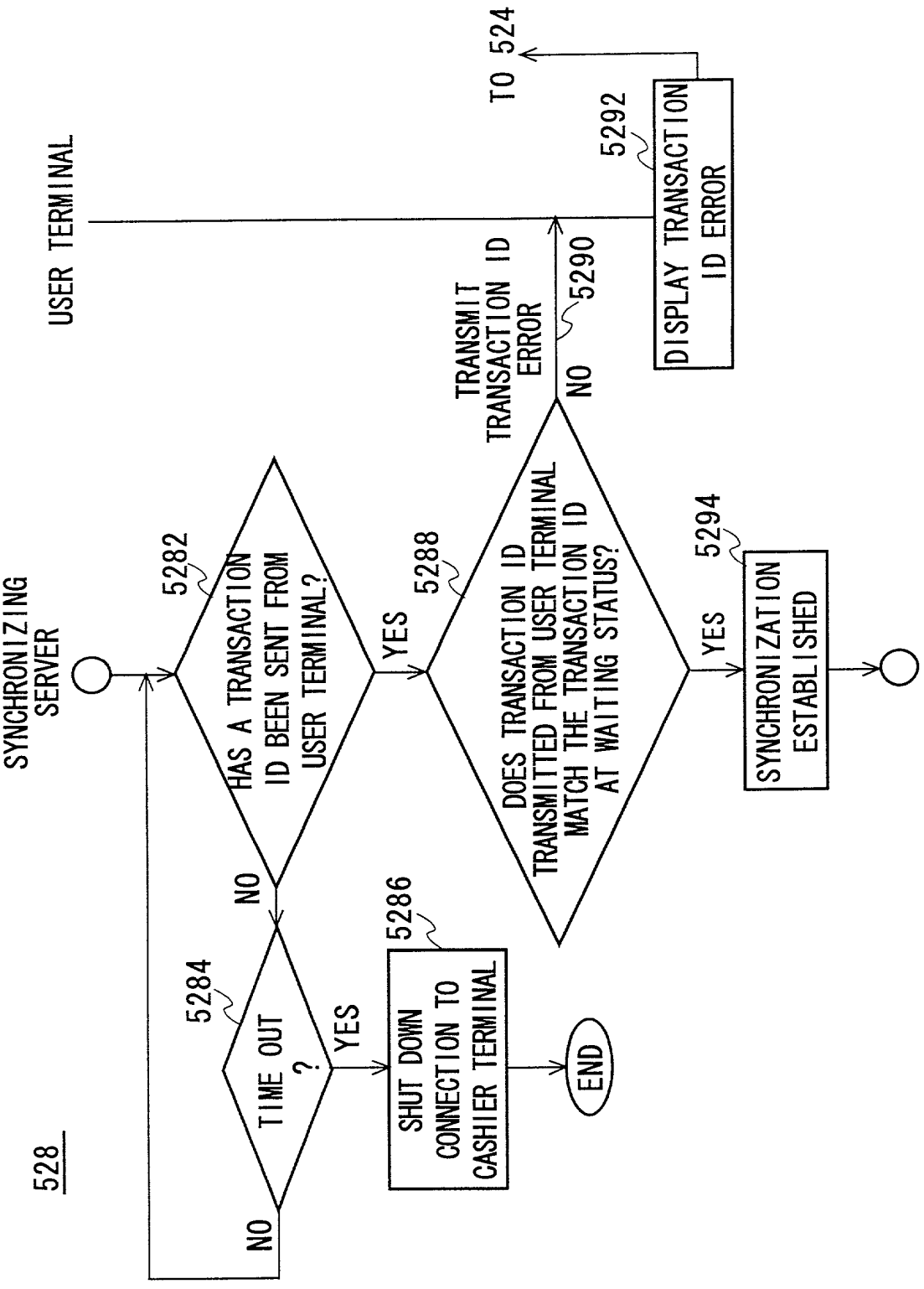

528
SYNCHRONIZING SERVER
5282
HAS A TRANSACTION ID BEEN SENT FROM USER TERMINAL?
YES
5288
DOES TRANSACTION ID TRANSMITTED FROM USER TERMINAL MATCH THE TRANSACTION ID AT WAITING STATUS?
YES
5294
SYNCHRONIZATION ESTABLISHED
NO
5284
TIME OUT ?
YES
5286
SHUT DOWN CONNECTION TO CASHIER TERMINAL
END
NO
TRANSMIT TRANSACTION ID ERROR
5290
NO
USER TERMINAL
5292
DISPLAY TRANSACTION ID ERROR
TO 524

FIG. 41

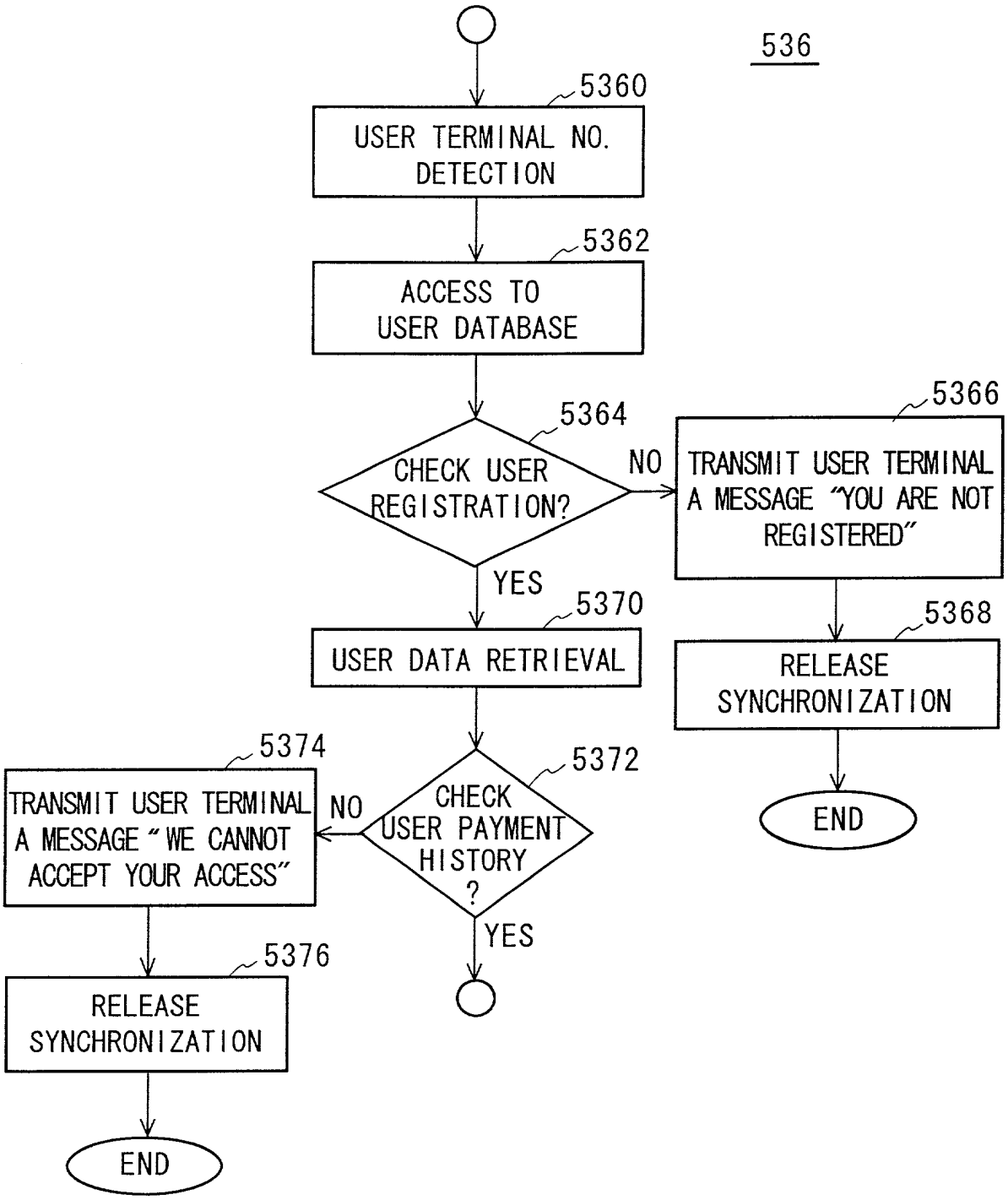

536
5360
USER TERMINAL NO. DETECTION
5362
ACCESS TO USER DATABASE
5364
CHECK USER REGISTRATION?
NO
5366
TRANSMIT USER TERMINAL A MESSAGE "YOU ARE NOT REGISTERED"
YES
5370
USER DATA RETRIEVAL
5368
RELEASE SYNCHRONIZATION
END
5372
CHECK USER PAYMENT HISTORY ?
NO
5374
TRANSMIT USER TERMINAL A MESSAGE "WE CANNOT ACCEPT YOUR ACCESS"
YES
5376
RELEASE SYNCHRONIZATION
END

FIG. 42

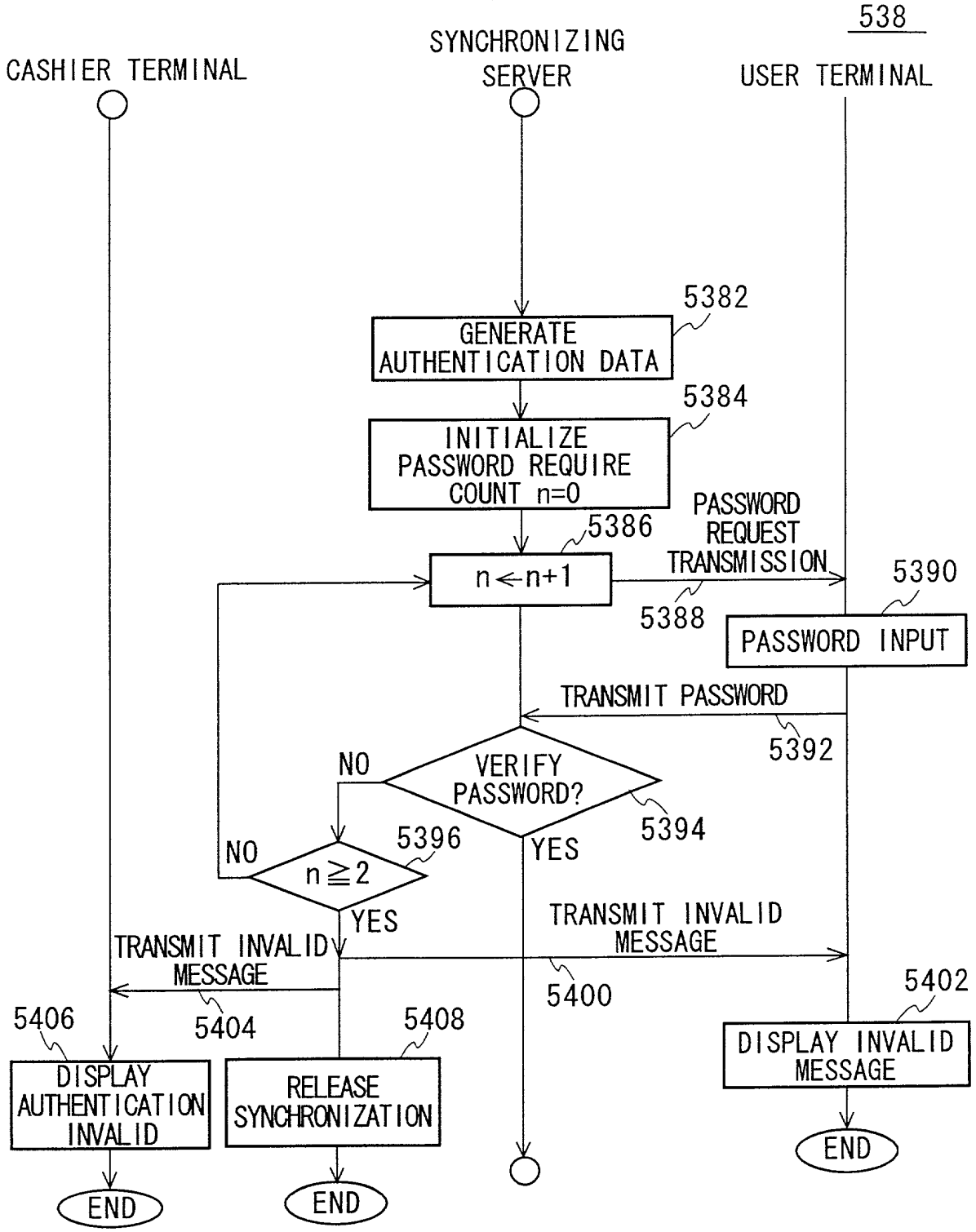

538
CASHIER TERMINAL
SYNCHRONIZING SERVER
USER TERMINAL
5382
GENERATE AUTHENTICATION DATA
5384
INITIALIZE PASSWORD REQUIRE COUNT n=0
5386
n←n+1
PASSWORD REQUEST TRANSMISSION
5388
5390
PASSWORD INPUT
TRANSMIT PASSWORD
5392
NO
VERIFY PASSWORD?
5394
YES
NO
n≧2
5396
YES
TRANSMIT INVALID MESSAGE
5400
TRANSMIT INVALID MESSAGE
5404
5402
5406
5408
DISPLAY AUTHENTICATION INVALID
RELEASE SYNCHRONIZATION
DISPLAY INVALID MESSAGE
END
END
END

FIG. 43

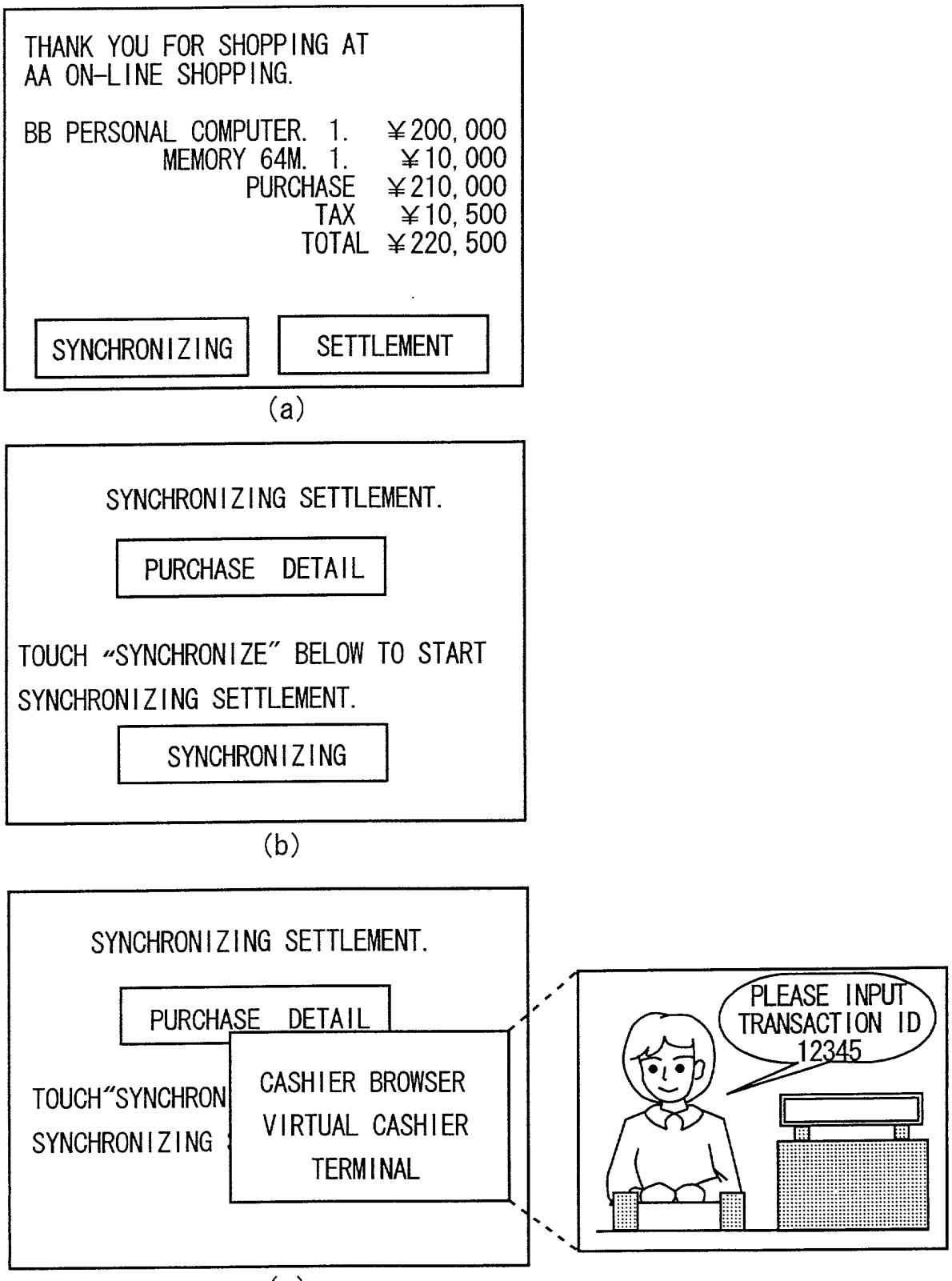

THANK YOU FOR SHOPPING AT
AA ON-LINE SHOPPING.
BB PERSONAL COMPUTER. 1. ¥200,000
MEMORY 64M. 1. ¥10,000
PURCHASE ¥210,000
TAX ¥10,500
TOTAL ¥220,500
SYNCHRONIZING
SETTLEMENT
(a)
SYNCHRONIZING SETTLEMENT.
PURCHASE DETAIL
TOUCH "SYNCHRONIZE" BELOW TO START
SYNCHRONIZING SETTLEMENT.
SYNCHRONIZING
(b)
SYNCHRONIZING SETTLEMENT.
PURCHASE DETAIL
TOUCH"SYNCHRON
SYNCHRONIZING
CASHIER BROWSER
VIRTUAL CASHIER
TERMINAL
PLEASE INPUT
TRANSACTION ID
12345
(c)

FIG. 44

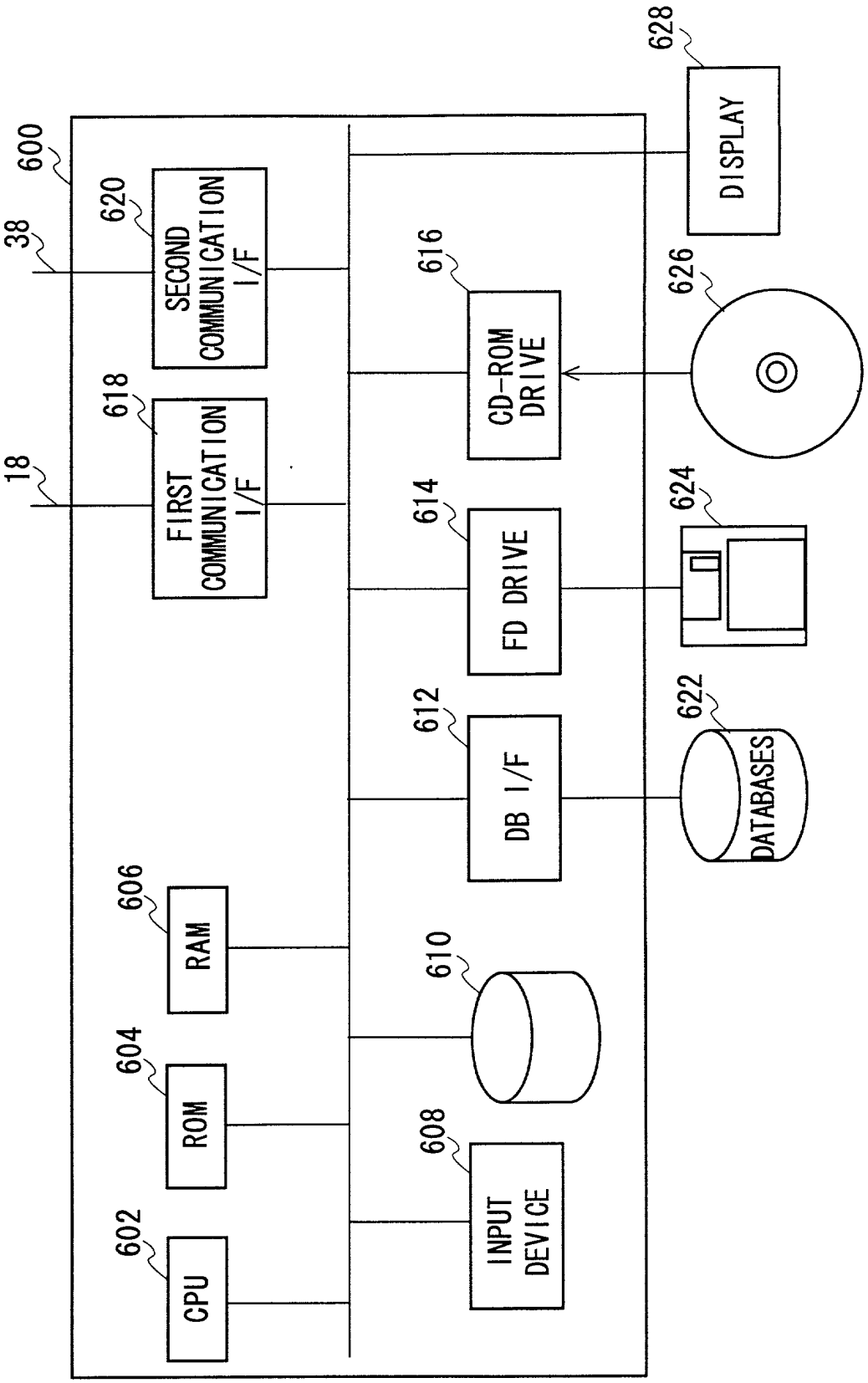

600
620
SECOND COMMUNICATION I/F
38
618
FIRST COMMUNICATION I/F
18
606
RAM
604
ROM
602
CPU
610
608
INPUT DEVICE
612
DB I/F
614
FD DRIVE
616
CD-ROM DRIVE
622
DATABASES
624
626
628
DISPLAY

FIG. 45

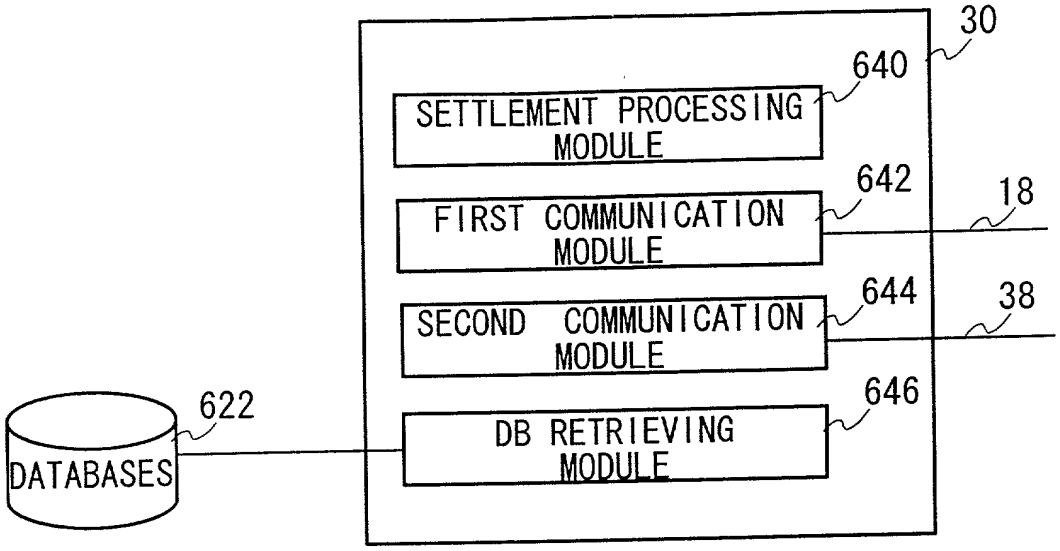

30
640
SETTLEMENT PROCESSING MODULE
642
FIRST COMMUNICATION MODULE
18
644
SECOND COMMUNICATION MODULE
38
646
DB RETRIEVING MODULE
622
DATABASES

FIG. 46

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

私の住所、私書箱、及び国籍は私の氏名の後に記載された通りです。

下記の名称の発明に関して特許請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）又は最初の共同発明者（下記の氏名が複数の場合）であると信じています。

電子決済システム、決済装置及び端末

上記発明の明細書（下記の欄で×印がついていない場合は本書に添付）は、

☐ __年__月__日に提出され、米国出願番号または特許協力条約国際出願番号が _____ であり、
(該当する場合) _____ に補正されました。

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

私は、連邦規則法典第３７編第１．５６条に定義されるとおり、特許性の有無に関して重要な情報を開示する義務があることを認めます。

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled ELECTRONIC SETTLEMENT SYSTEM, SETTLEMENT APPARATUS, AND TERMINAL

the specification of which is attached hereto unless the following box is checked:

☐ was filed on

as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37. Code of Federal Regulations. Section 1.56.

Japanese Language Declaration

（日本語宣言書）

私は、米国法典第３５編第１１９条(a)-(d)項又は３６５条(b)項に基き、下記の、米国以外の少なくとも一ヵ国を指定している特許協力条約第３６５(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願に基づく外国優先権をここに主張します。優先権を主張している、本出願以前に出願された特許または発明者証の外国出願を、以下に、枠内をマークすることで示します。

I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365 (a) of any PCT International application which designated at least one country other than the United States listed below and have also identified below by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is clamed.

Prior Foreign Application(s)
外国での先行出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	Priority Not Claimed 優先権主張なし
			☐
			☐

私は、第３５編米国法典第１１９条(e)項に基いて下記の米国仮特許出願の利益をここに主張いたします。

I hereby claim the benefit under Title 35. United States Code. Section 119(e) of any United States provisional application(s), listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)

私は、下記の米国法典第３５編１２０条に基いて下記の米国特許出願の利益、又は米国を指定している特許協力条約３６５条(c)の利益をここに主張します。また、本出願の各請求項の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先の出願の出願日と本米国国内出願日または本国際出願日との間に入手された、連邦規則法典第３７編第１．５６条で定義された特許性の有無に関する重要な情報を開示する義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

PCT/JP99/04178	August 2, 1999	Pending
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status. : Patented. Pending. Abandoned) (現況： 特許許可済、 係属中、 放棄済)
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status. : Patented. Pending. Abandoned) (現況： 特許許可済、 係属中、 放棄済)

私は、私自身の知識についてここで行なった表明が真実であり、かつ情報及び私の確信について行った全ての表面が真実であり、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基づき、罰金もしくは拘禁、またはそれらの両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願し又は既に許可された特許の有効性が失われることを認識した上で上記の表面が行われたことを宣誓致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration

（日本語宣言書）

委任状： 私は下記の発明者として、本出願に関する一切の手続を米特許商標局に対して行なう弁理士および／または代理人として、下記の者を指名いたします。（氏名及び登録番号を記載）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

And I hereby appoint Pillsbury Madison & Sutro LLP, Intellectual Property Group, 1100 New York Avenue, N.W., Ninth Floor, East Tower, Washington, D.C. 20005-3918, telephone number (202) 861-3000 (to whom all communications are to be directed), and the below-named persons (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete names/numbers below of persons no longer with their firm and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and /or a below attorney in writing to the contrary.

Paul N. Kokulis	16773		20817	Paul E. White. Jr.	32011	Stephen C. Glazier	31361
Raymond F. Lippit	17519	George M. Sirilla	18221			Paul F. McQuade	31542
G. Lloyd Knight	17698	Donald J. Bird	25323			Ruth N. Morduch	31044
Carl G. Love	18781			G. Paul Edgell	24238	Richard H. Zaitlen	27248
		Peter W. Gowdey	25872	Lynn E. Eccleston	35861	Roger R. Wise	31204
		Dale S. Lazar	28872	David A. Jakopin	32995		
Kevin E. Joyce	20508	Glenn J. Perry	28458	Mark G. Paulson	30793		
		Kendrew H. Colton	30368	Timothy J. Klima	34852		

唯一または第一発明者名 Full name of sole or first inventor

Keiichi NAKAJIMA

発明者の署名 Inventor's signature

Keiichi Nakajima

日付 Date

Jan. 30, 2001

住所 Residence

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国籍 Citizenship

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第二共同発明者名 Full name of second joint inventor, if any

第二共同発明者の署名 Second inventor's signature

日付 Date

住所 Residence

国籍 Citizenship

私書箱 Post Office Address

（第三以降の共同発明者についても同様に記載し、署名をすること） （Supply similar information and signature for third and subsequent joint inventors.）